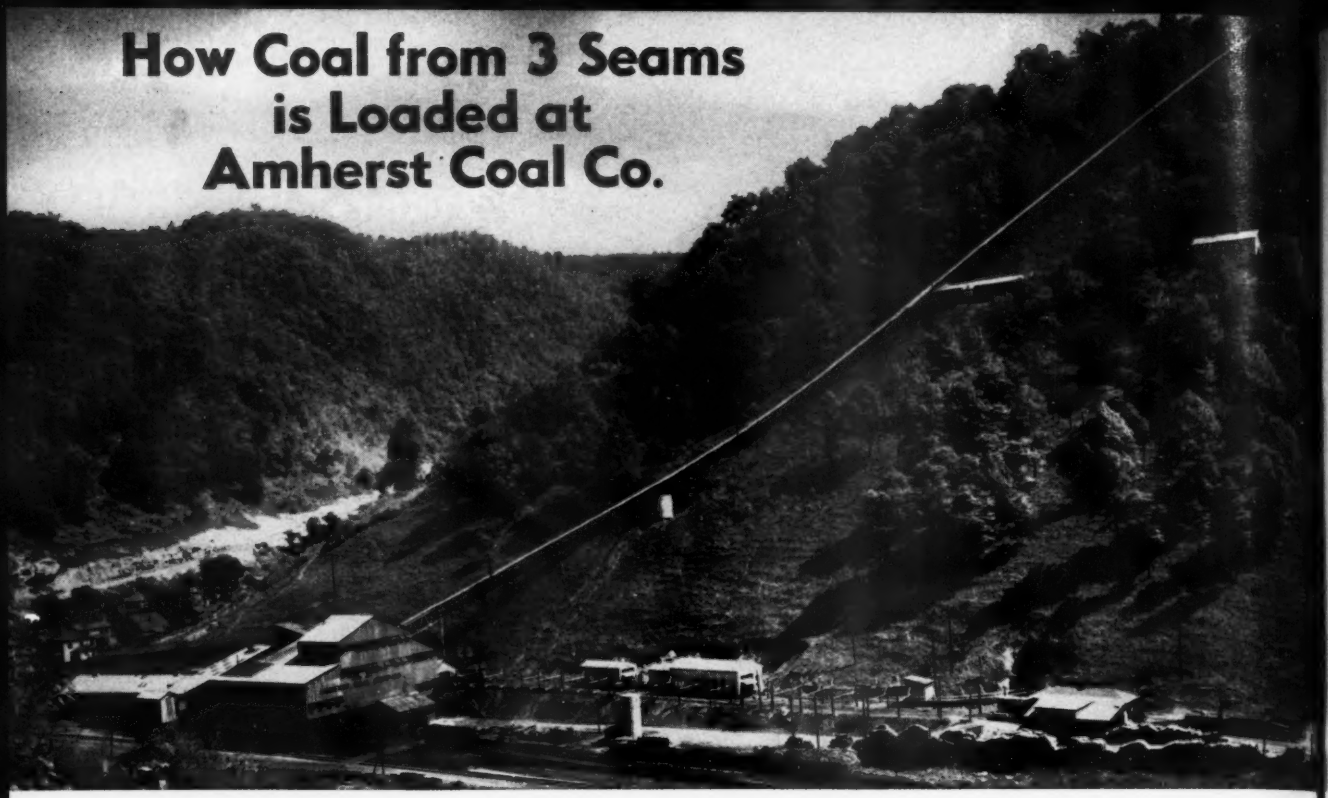
Mining CONGRESS JOURNAL

SEPTEMBER 1950

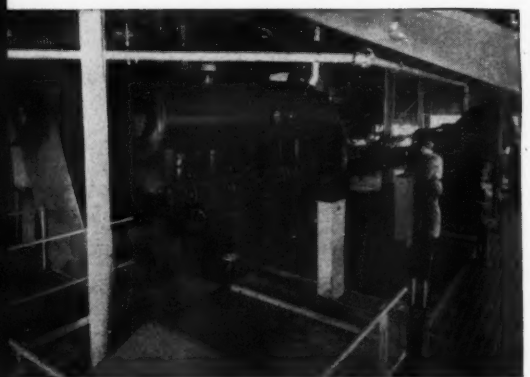
How Coal from 3 Seams is Loaded at Amherst Coal Co.



LINK-BELT COAL WASHER

THIS STEEL WASHER DOES ONE JOB WELL, BUT . . .

The coal washer shown below does many jobs well. In the coal preparation plant of the Amherst Coal Company this Link-Belt air-pulsated washer cleans coal from three different seams and also the product of another mine. Installed to clean 250 TPH. of 5″ x ¼″, it is now handling about 300 TPH. of this size plus considerable portion of the ¼″ x 0″.



Higher efficiency, lower cost and better quality of end products are among the benefits of modernization of coal handling and complete preparation including centrifugal and thermal drying at Amherst No. 1 mine at Amherstdale, West Virginia.

Coal is loaded from the Chilton, the Powellton and the Eagle seams. Foreign coal from the Amherst No. 3 mine is also brought to this plant by rail for preparation.

Link-Belt made major changes to the plant, furnishing complete new ROM screens with shaking picking table, vibrators for making separation at ¼″, mixing conveyor equipment, air-pulsated washer and auxiliary equipment. Also mine car handling equipment and belt conveyor.

Modernization of coal preparation and handling is making great strides forward in America. Our engineers will be glad to discuss your problems with you.

This shaking picking table is also a valuable addition to this plant. It replaces an apron type picking table and eliminates frequent delays due to the inability of many pickers to do the job. Picking is now done efficiently by two men, as shown above.

11.M3

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Johannesburg.

LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

Service...

your interests of first importance—

There are **2** *ways of doing your diamond drilling*

One is to do it yourself.
The other is to contract it.

Doubtless you ask yourself "which is the better way for me?" The decision, of course, rests with you, but first consider how your own best interests will be served by contracting your drilling to Longyear. Here are some of the specific advantages:

1. Your job is studied from your viewpoint, and the objectives to be accomplished. Your interests are of first importance.

2. The right drill for efficient work will be selected for your job. This saves you an investment in equipment.

3. Experienced drill crews carry on under competent direction. They are resourceful in handling complex drilling problems. Competency saves you money, because delays due to inexperienced operators are eliminated.

4. Longyear improved coring equipment gives you the best core recovery possible in any given formation . . . *CORES TELL THE STORY.*

Decide to have Longyear demonstrate the above advantages on your job. Our Contract Drilling Division will respond to your call.

E. J. LONGYEAR COMPANY

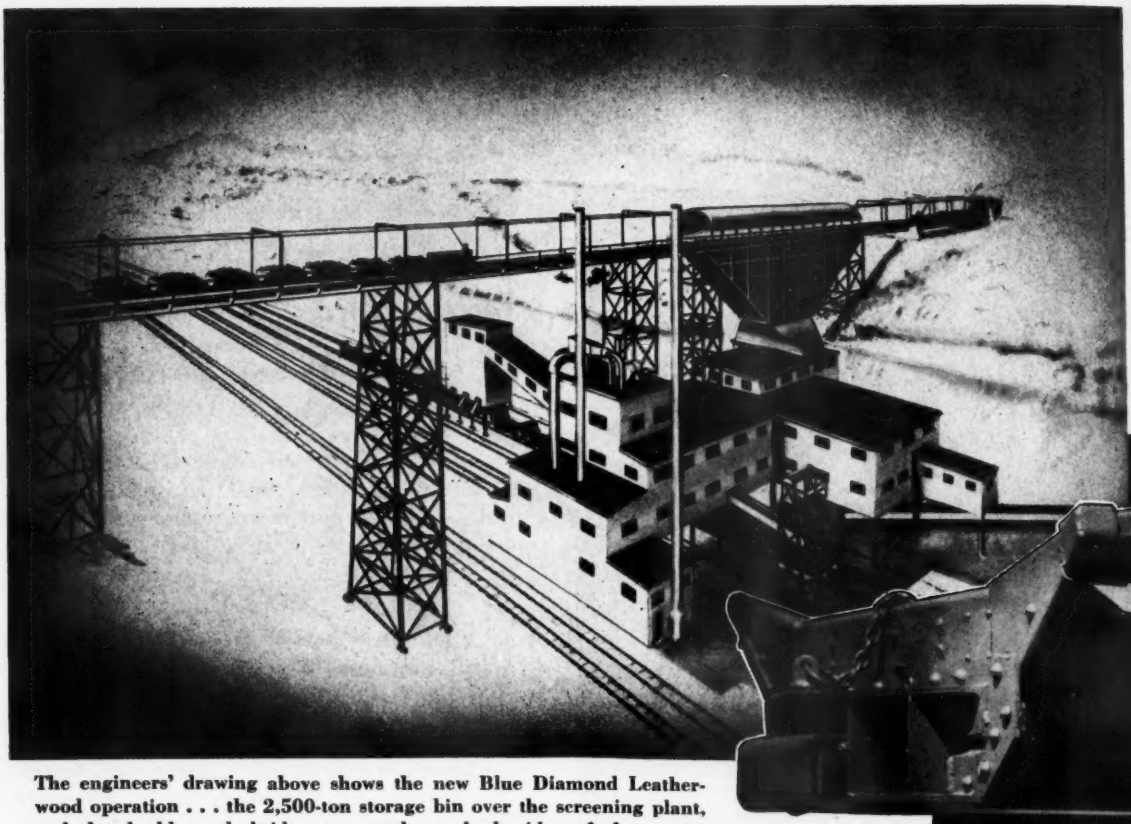
MINNEAPOLIS, MINNESOTA, U.S.A. NEW YORK OFFICE, 1775 BROADWAY

CANADIAN LONGYEAR, LIMITED, NORTH BAY, ONTARIO, CANADA

DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES

BLUE DIAMOND'S *Leatherwood..*



The engineers' drawing above shows the new Blue Diamond Leatherwood operation . . . the 2,500-ton storage bin over the screening plant, and the double-track bridge to portals on both sides of the gorge. It is one of the most outstanding structures of its kind in the United States . . . a design of beauty as well as maximum production efficiency. Roberts and Schaefer, Chicago, are the engineers and contractors.

S-D 1-2-3 "AUTOMATICS" IN SERVICE AT LEATHERWOOD

There are 140 12-foot, and 390 16-foot S-D 1-2-3 "Automatics," all new cars, in service . . . a total of over 500 cars. This is proof of the efficiency of S-D "Automatics" well known by a firm with years of experience using them.

For complete information on how S-D "Automatics" can step-up your production and cut haulage costs, write today!

This advertisement published with the permission of Blue Diamond Coal Co.

SANFORD-DAY
KNOXVILLE

..one of the world's greatest coal producing ntures . . . on the way to Greater Production

Operation of Blue Diamond's Leatherwood, Ky. Mine Starts With Over 500 New S-D 1-2-3 "Automatic" Drop-Bottom Cars!

Blue Diamond Coal Company, well known as one of the coal industry's most progressive operators, has set its new Leatherwood mine capacity at 8,000 tons daily. A special feature of this new ultra-modern and efficient operation is the 2,500-ton storage bin built directly over the screening and cleaning plant. This storage bin permits three-shift operation of mine with only two-shift operation of screening plant because S-D 1-2-3 "Automatics" can fill the bin to track level.

Five hundred and thirty new S-D 1-2-3 "Automatics," like the one shown below, completely dust-sealed for safety and savings, serve Leatherwood's haulage requirements.

For record-making haulage — dumping-on-the-move . . . for low cost operation day-in and day-out, no other car can match the S-D 1-2-3 "Automatic" system of haulage in coal mining.

Y I R O N W O R K S

T E N N E S S E E

Get *instant starting* and *rapid acceleration* with

Exide-Ironclad Battery POWER

Your battery-powered haulage units will be fast moving when powered by Exide-Ironclads. That means you get more trips per shift, more production per man per hour . . . at less cost per ton handled. Also, Exide-Ironclads provide:

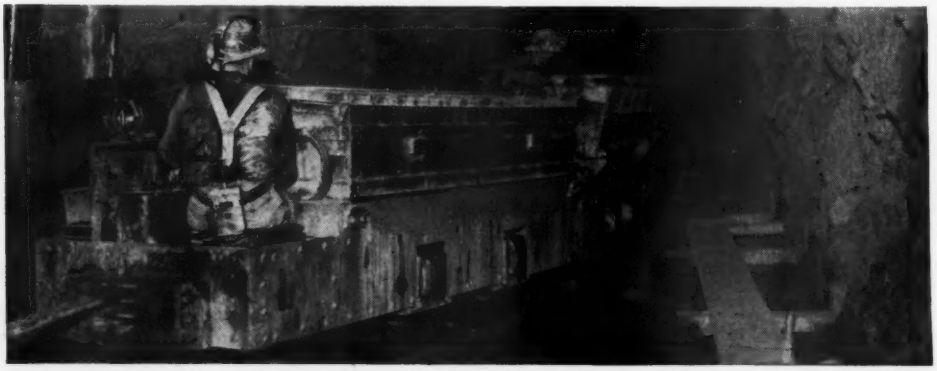
- High power ability—they can discharge, without harm, at many times their rated capacity.
- Large reserve power for all normal and emergency needs.
- Safe haulage—the only kind permitted in gaseous mines.
- Full shift availability, with as much tonnage moving during the last hour as during the first.
- Flexibility—quick car changes, less idle loader time, steadier main-line operations.
- Low costs of operation, maintenance, depreciation, repair.
- Exceptionally long life, proved in more than 100,000 heavy-duty jobs.

Combined, these and other outstanding characteristics assure you that . . .

Exide-Ironclad Batteries are the Best Power Buy . . . AT ANY PRICE

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto
"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950



JULIAN D. CONOVER
Editorial Director

SHELDON P. WIMPFEN
Editor

Associate Editors
A. W. DICKINSON
G. B. SOUTHWARD
H. L. MOFFETT

Production
B. C. WILKERSON
J. J. WARD

Mining CONGRESS JOURNAL

Advertising
P. D. MCMURRER, Mgr.

FRANK W. MORAN
(Chicago)

RALPH F. DUYSTERS
(New York City)

RALPH W. HARKER
(Los Angeles and San Francisco)

Contents

VOLUME 36, NUMBER 9 FOR SEPTEMBER, 1950

PAGE

FRONT COVER: Preparing to break down a face at West Kentucky Coal Co.

EDITORIALS 27

TRACKLESS MECHANIZED MINING IN THE LEAD BELT 28
By R. T. MURRILL AND PETER B. NALLE

PENSIONS FOR SUPERVISORY EMPLOYES 32
By C. N. CRICHTON

PERPETUATION OF THE DOMESTIC MINING INDUSTRY 35
By PAUL H. HUNT

INGENIOUS DEVICES MEET SPECIAL PROBLEMS 37

NORTHERN IRON ORE MEETS STRATEGIC NEEDS—PART II 48
By JOHN E. KELLY

VENTILATION FOR CONTINUOUS MINING 51
A Report of the Mine Ventilation Committee, Coal Division, AMC

WHEELS OF GOVERNMENT 57

PERSONALS 59

NEWS AND VIEWS 61

MANUFACTURERS FORUM 73

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

Indexed regularly by Engineering Index, Inc.

Copyright 1950, by

THE AMERICAN MINING CONGRESS
1102 RING BLDG., WASHINGTON 6, D. C.

HOWARD I. YOUNG, *President* · DONALD A. CALLAHAN, *Vice President* · ANDREW FLETCHER, *Vice President* · WILLIAM J. JENKINS, *Vice President* · JULIAN D. CONOVER, *Secretary*

Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.

ABC
Member Audit Bureau of Circulation.

The JOY *Hydraulic* ROOF BOLTING DRILL

Fastest Drilling Unit Available

for Roof Bolting

Built in 26", 30" or 36" High models

- ★ Performance of the JOY RBD-1 Hydraulic Roof Bolting Drill is *proved* by months of operation in the field.
- ★ Wherever rotary drills are applicable, it has consistently out-drilled other types—both pneumatic and electric drills—*producing as many as two-thirds more holes per shift!*
- ★ In practically all cases, this Drill will bottom your roof-bolting holes with only one steel change—something that *no other drill will do* except in the thickest seams.
- ★ The JOY Hydraulic Roof Bolting Drill is rubber-tired and self-propelled—equipped with hydraulic controls for *one-man operation.*
- ★ May be equipped for wet drilling—or with vacuum dust remover, as desired, *to eliminate objectionable dust.*
- ★ The Drill employs boom feed, and is *self-leveling* and *self-aligning* while drilling.
- ★ SULMET Carbide Bits and Drill Steels specially designed for the RBD-1 Drill are available.

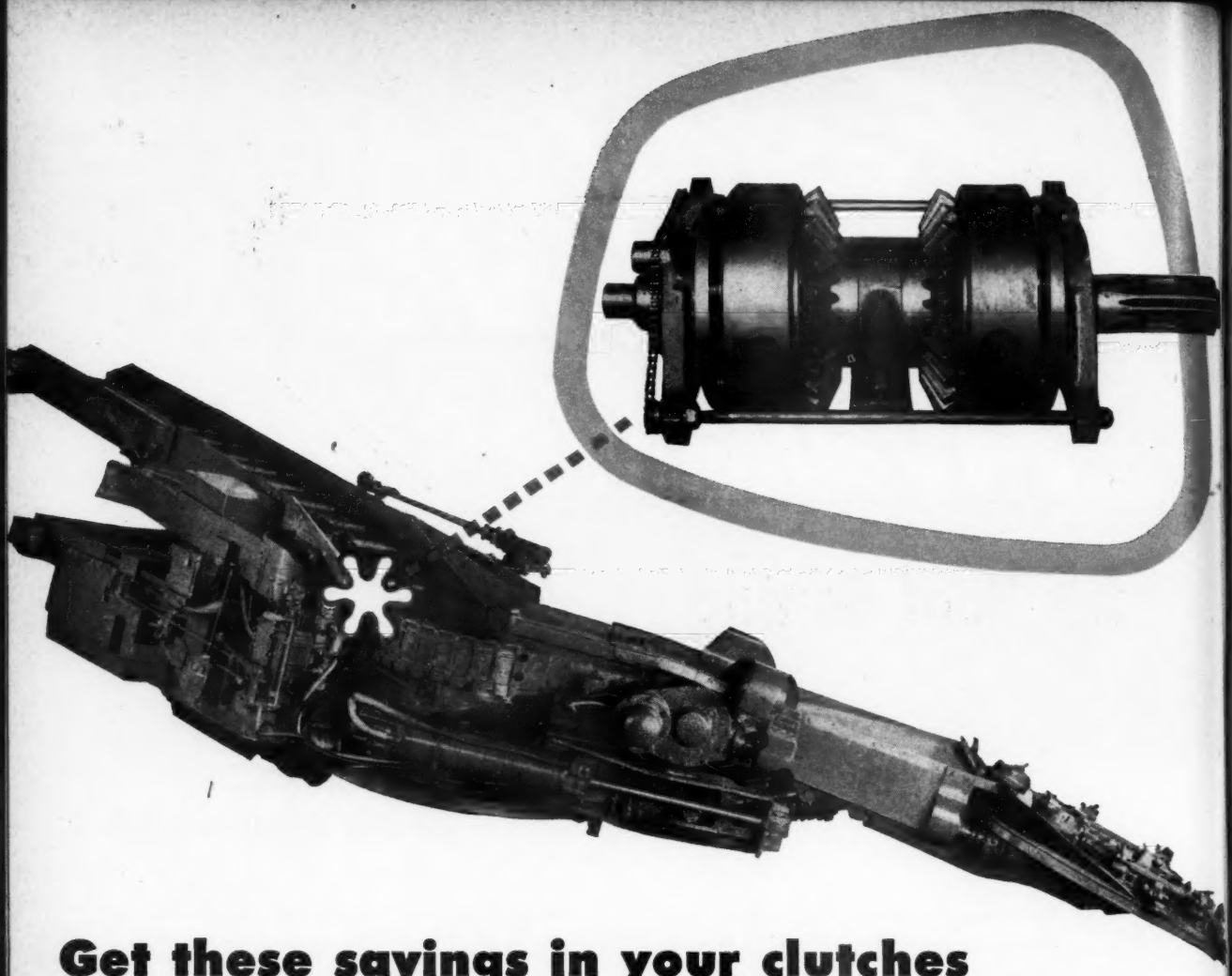
Consult a Joy Engineer

D CL3ORO

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



Get these savings in your clutches

● If you're looking for increased loader efficiency, don't overlook the importance of clutches. There is much evidence to prove that better clutch operation cuts maintenance costs and boosts tonnage. The evidence is equally clear that SUPERLA Mine Lubricants contribute to efficient clutch operation in at least three important ways:

Eliminate Warm-up Time SUPERLA Mine Lubricants are fluid at low temperatures. When machines start, the lubricant readily flows over clutch plates. This eliminates drag, permits loading operations to be started immediately.

Shorten Loading Time SUPERLA Mine Lubricants keep clutch plates clean and free for action. This allows smooth operation of clutch controls. Machines can be handled more easily. Loading takes less time.

Reduce Repair Costs SUPERLA Mine Lubricants do not thin out excessively at machine-operating temperatures. This quality assures proper lubrication of clutches during long periods of continuous operation. Safer and cleaner lubrication keeps clutch maintenance at a minimum. Loaders stay on the job longer, load out more coal.

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricants

A trial of SUPERLA Mine Lubricants in your equipment will prove their ability to make savings for you. Grades are available for both oil- and grease-lubricated loaders. Ask for the services of a Standard Oil Lubrication Engineer.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

It's TOBIN BRONZE

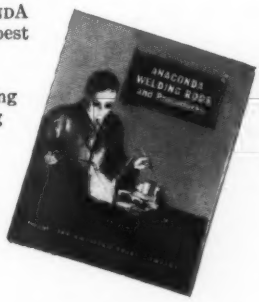
IF you've done the job right, it's a good weld when you've made it with Tobin Bronze.* This famous ANACONDA Welding Rod has been proving that for decades.

There's an important principle behind this. It's the fact that the low temperatures required with bronze prevent internal stresses from building up. This minimizes the danger of warping or cracking. And when you finish the weld, you get the bonus of bronze's easy machinability.

It's poor business to gamble on a weld when you don't have to. Welders know that where reliability, speed and economy count, they can depend on Tobin Bronze, ANACONDA 997 Low Fuming Bronze and other proven ANACONDA Welding Rods. They are products of The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 49154

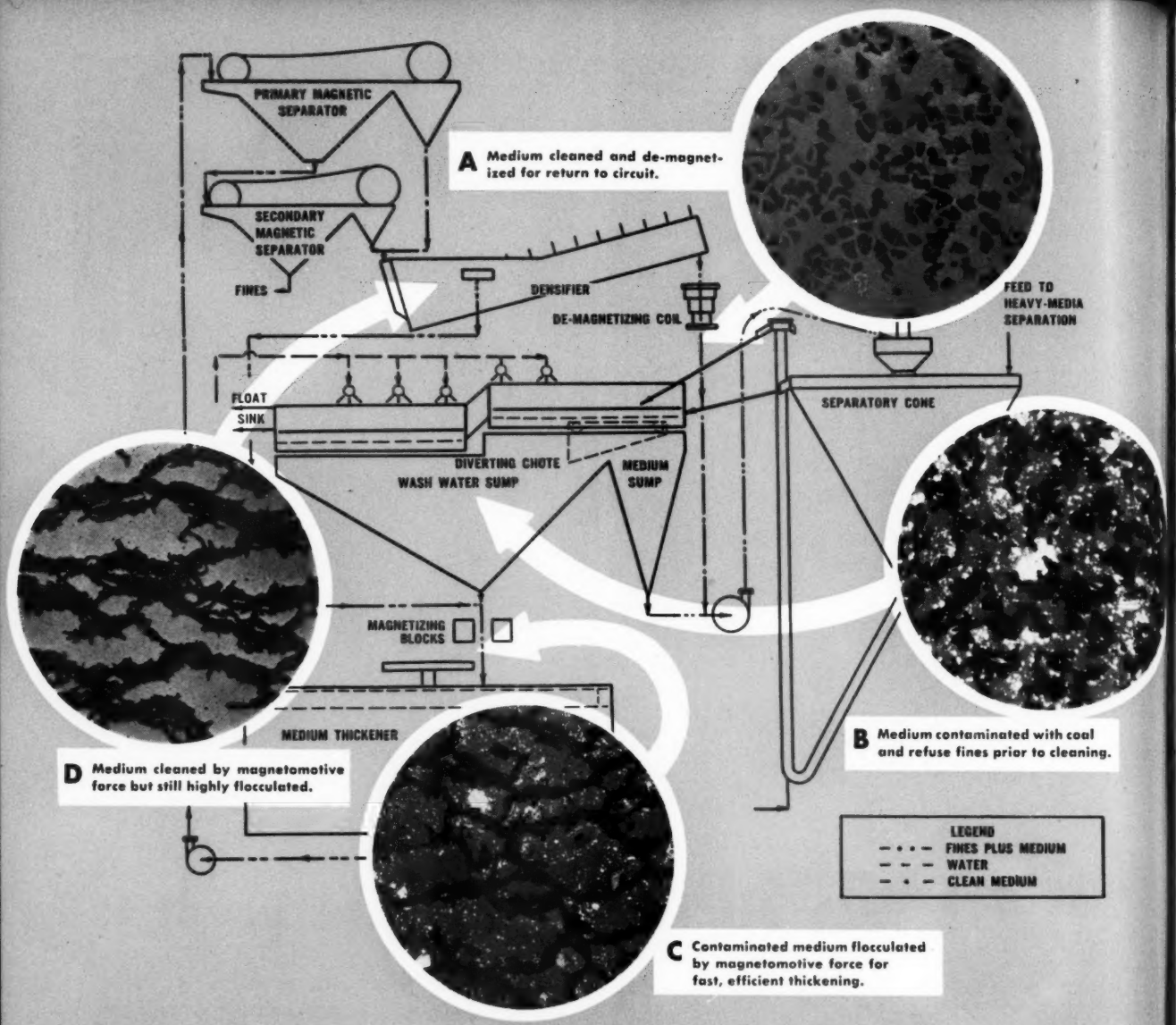
24 Pages of Welding Rod Facts!

New, 17th edition of ANACONDA booklet tells how to pick the best welding rod for the job. Characteristics and recommended uses of various welding alloys. Procedures for welding specific metals. Practices to follow in oxyacetylene, carbon arc, metal arc and inert-gas-shielded welding. Color-temperature conversion table. Be sure you get a copy. Write today. Ask for Publication B-13.



*Reg. U.S. Pat. Off.

You can depend on ANACONDA BRONZE WELDING RODS



Photomicrographs show how

Heavy-Media Separation provides the most accurate separation at any desired specific gravity between 1.25 and 2.50

For years, laboratory float-sink results have been the standard against which all coal cleaning methods are compared. For years, preparation engineers have known that a float-sink process employing a mixture of a finely ground, heavy solid and water (as a substitute for heavy liquids) offered the greatest promise to equal on a commercial scale the perfect separations obtained in the laboratory. And magnetite was known to possess the ideal characteristics for the medium solid—high specific gravity (5.0), abrasion and rust resistance, ready availability, low cost.

But despite these inherent advantages, the use of float-sink methods employing fine magnetite never achieved widespread commercial success until the development of Heavy-Media Separation Processes. The signal success of Heavy-Media Separation is based on unique and exclusive applications of magnetomotive force to provide the necessary constant control, conditioning and recovery of the magnetite medium.

Photomicrographs of medium samples taken from an operating plant at the indicated points in the flow scheme show clearly how Heavy-Media Separation provides this precise and automatic medium control.

A shows the clean, dispersed and uniform magnetite that must be continually returned to the separating pool in order to maintain the medium at the desired specific gravity and to keep the viscosity low enough so that it will not interfere with sharp separation of clean coal from refuse. By controlling the amount of medium sent through the cleaning circuit, the operator can maintain the specific gravity of the medium in the separating pool within ± 0.01 of the optimum separating gravity.

B shows dirty medium washed from the separated coal and refuse. Black areas are particles of magnetite. White and grey spots are clay, fine coal and slate, pyrite, etc. that must be quickly and constantly removed so that these contaminants will not lower the gravity or raise the viscosity of the separating medium.

C shows the dirty medium after passing through magnetizing blocks. It is now well flocculated for fast settling in the medium thickener where the magnetite quickly sinks while fines and excess water overflow. Magnetomotive flocculation permits the use of relatively small, efficient thickeners for lower plant costs.

D shows the medium after passing through the 99.9+% efficient magnetic separators. Non-magnetic foreign matter has been eliminated. The magnetite is now clean, but still in a flocculated, fibrous, magnetized state. To destroy the magnetic charge and allow the magnetite to disperse readily, it next passes through a demagnetizing coil. The magnetite is now clean, dispersed and comparable in quality to its original condition (shown in A) . . . ready to return to the separating pool.

No other float-sink method provides this exclusive 4-stage medium control with attendant low medium cost. No other method—float-sink or mechanical—provides the same uniform excellence of separating efficiency hour after hour, regardless of normal fluctuations in rate or character of feed coal.

Before you decide upon a new cleaning plant or the modernization of your present washer, it will pay to make a comparative study of the higher recovery and better grade of coal you can obtain by using Heavy-Media Separation. American Cyanamid Company, as Technical and Sales Representative for Heavy-Media Separation Processes, will work closely with you and engineers of your choice in the design and initial operation of Heavy-Media Units. We are prepared to run carload tests on your coal in the Heavy-Media Separation pilot plant of the Cyanamid Mineral Dressing Laboratory, and to give you every practical help in fitting these cleaning methods to your conditions.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK

Better piping for every job from a single source... CRANE

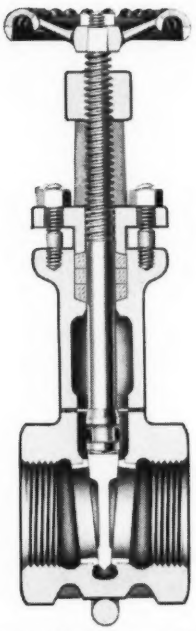
EASY-TO-SERVICE VALVES FOR MINES

Note how easy it is to dismantle these Crane Clamp Gates. By loosening two nuts, the complete bonnet assembly can be lifted out without removing the valve body from the line. Repeated opening does not affect bonnet joint tightness. Unusually compact, these brass trimmed valves are ideal for all common services in and around mines.

For heavy fluid service and on lines subject to gumming, Crane recommends all-iron inside screw clamp gates. Improved free-draining bonnet prevents entrapment of line fluids. Specially designed bonnet threads have wiping action on stem screw, which prevents sticking.

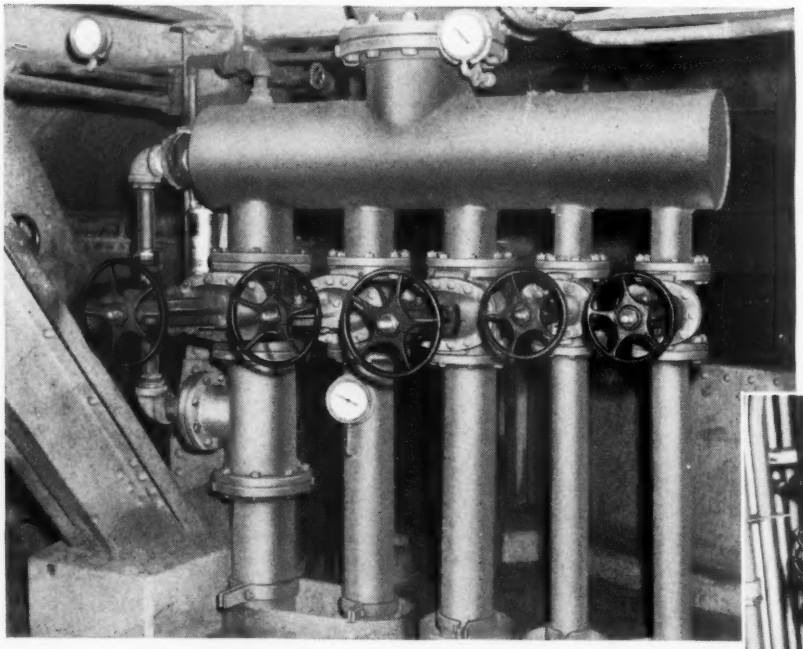
Crane Clamp Gates are available in patterns for every need: Inside Screw, O. S. & Y., and Quick-Opening. Choice of flanged or screwed ends. See your No. 49 Crane Catalog, or send for Folder AD-1667.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



No. 486½, Screwed Clamp Gate. Working Pressures: up to 150 pounds saturated steam; 225 pounds water, oil, gas. Sizes: ½ to 4-in.

ONE ORDER TO CRANE CAN COMPLETELY EQUIP ANY MINE PIPING INSTALLATION



MANIFOLD TO PEA AND BUCK CONE *in breaker plant; also to agitator rings and classifier. Crane supplies all piping materials for installations of this kind.*

ROTO-SLEEVE BY-PASS *equipped with Crane brass trimmed clamp gate valves.*

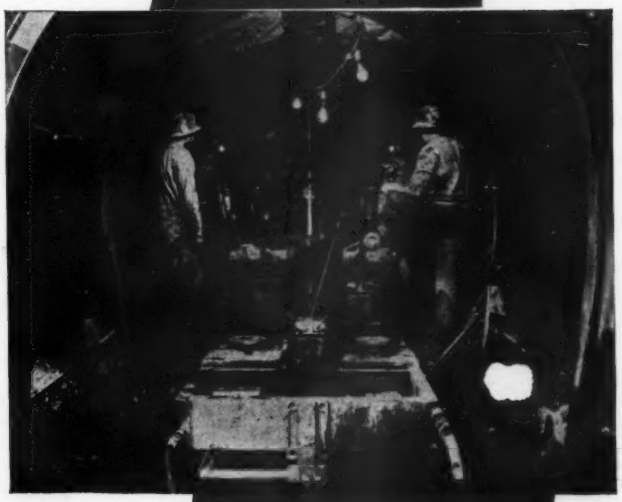
EVERYTHING FOR EVERY PIPING SYSTEM

CRANE

VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

GARDNER-DENVER Speeds TUNNEL CONSTRUCTION

Ready to hook up and go — "packaged" WBJ Compressors require no special foundation — no water piping — no external cooling devices. That's why you get air power "on tap" days ahead of schedule — with a smaller investment in the compressor house. And remember, smooth-running WBJ Compressors — with balanced construction and self-contained cooling system — assure dependable, low-cost air to speed every foot of the bore.



Save drilling time every round — choose versatile Gardner-Denver Hydraulic Drill Jumbos with *"creep-free"* booms. Faster on the setup — faster from hole to hole — faster tearing down. Handle up to 10-foot steel changes — give you low-cost drilling — faster, properly drilled rounds.

For complete information, write Gardner-Denver Company.

GARDNER-DENVER

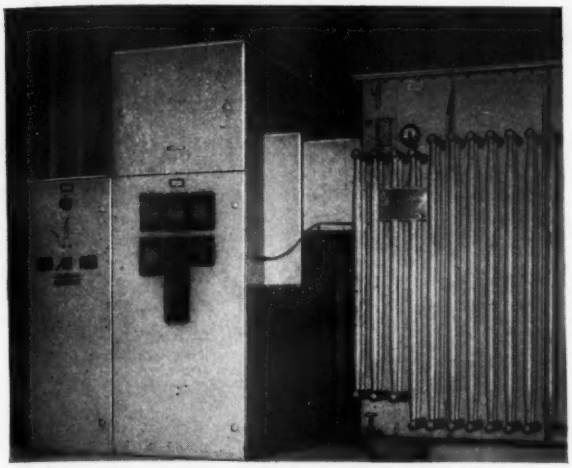
Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

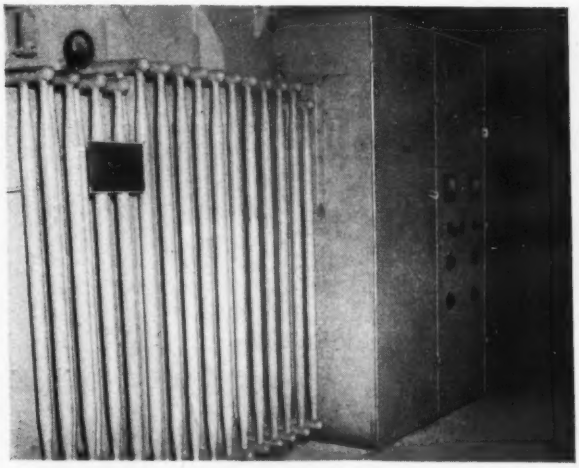
Island Creek saves 3 ways with G-E Rectifier!

Mercury-Arc Rectifiers
–to cut mining costs!

Installation costs cut! In installing this G-E 300-kw mining-type rectifier, Island Creek Coal Co. saved an estimated $140 by eliminating special foundations, cable ducts, etc. needed with rotating converters. Completely automatic in operation, G-E rectifiers can be placed in remote locations, without constant attendance. Use of shorter d-c lines is made possible, and voltage drop is reduced

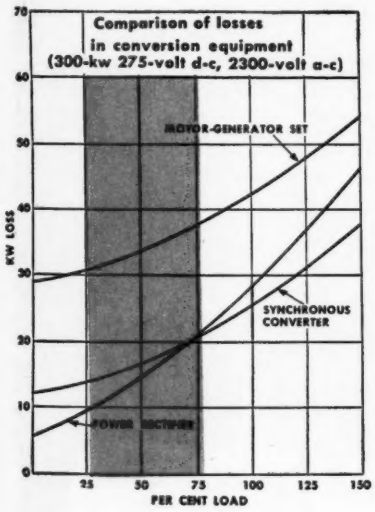
General Electric mining-type rectifier at Island Creek Coal Co., Holden, W. Va., saves an estimated $220 power cost and $250 maintenance cost every year—plus installation savings of $140!





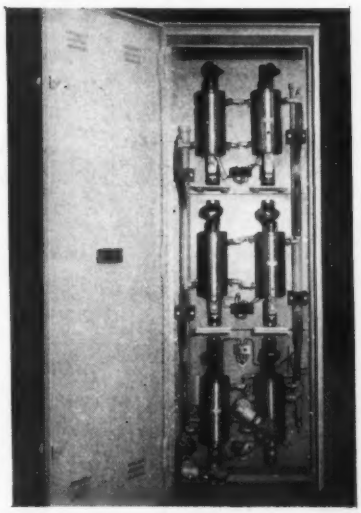
Personnel protected! To minimize the possibility of personnel coming into accidental contact with live parts, all units are deadfront, completely metal enclosed. Shown above are incoming a-c switchgear section and part of power transformer section. (At right: Rest of power transformer section, plus rectifier section and d-c switchgear section.)

Downtime reduced! A G-E rectifier has no major rotating parts to wear and interrupt service for replacement or cleaning. Protective devices automatically trip it off in case of a fault, minimizing downtime caused by damage to equipment. With full voltage at the face, mining machines operate more efficiently, with fewer interruptions.



Power costs cut! (left) Average mining load varies from 25 to 75 per cent of the conversion equipment's rating. In this range, as chart shows, power rectifiers have higher conversion efficiency than rotating machines. Island Creek Coal Co. estimates power savings at $220 annually from one G-E 300-kw rectifier alone.

Maintenance costs cut! (right) Steel panels isolate firing circuits from tubes and water cooling system, protecting electrical components. Rectifier unit has easily accessible parts, needs only an infrequent tube replacement and addition of water in the cooling system. Island Creek Coal Co. calculates its maintenance savings at $250 per year on one G-E rectifier.



SERVICE-PROVED! Over 250 G-E sealed tube mercury-arc rectifiers for mining service, in both stationary and portable types, are now in use throughout the country, some for more than 12 years. For more detailed information, write for new bulletin GEA-4047, or check with your nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady, N. Y.*

GENERAL ELECTRIC

663-10

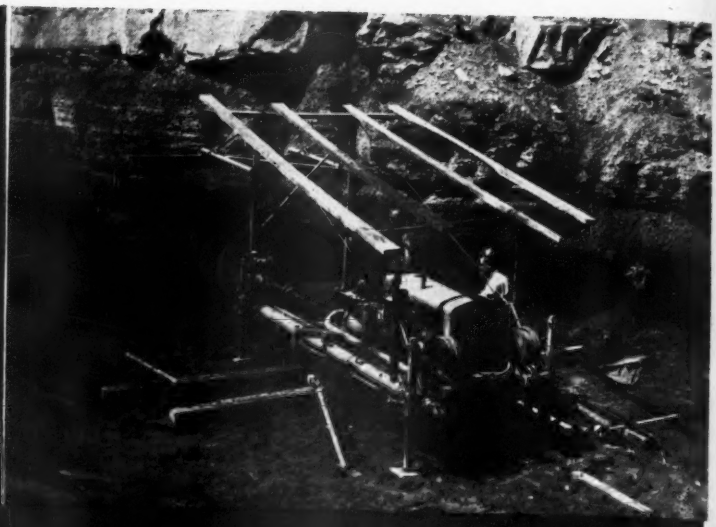
When Recovery Costs Are OVERBURDENED

CARDOX-HARDSOCG

DIRECT MINING DRILLS

When overburden removal becomes too costly for further profitable stripping, it's not necessarily the signal to abandon operations. In just such conditions, the CARDOX-HARDSOCG Direct Mining Drill has enabled many mines to continue *economical* coal production.

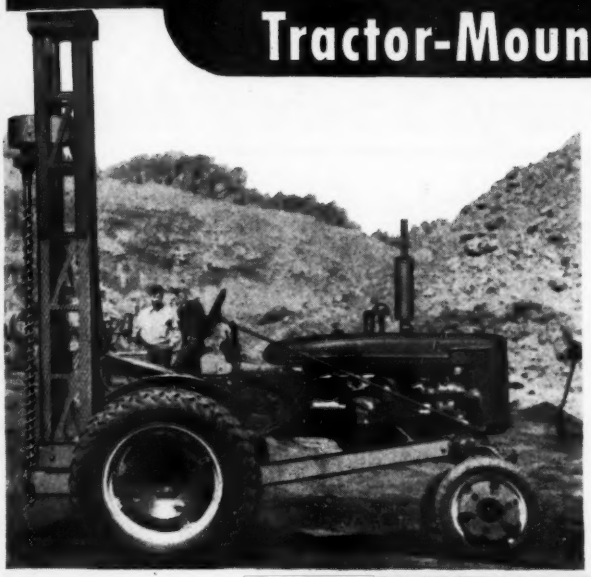
These units, designed specially for the purpose, drill into the seam and bring out the coal in a continuous stream. Teamed up with portable conveyors (see illustration), they provide facilities for automatic loading of trucks.



CARDOX-HARDSOCG Direct Mining Drills handle augers up to 40 inches in diameter. Augers to 24 inches are powered by a 32 H. P. engine; larger augers by a 100 H. P. or larger engine. All Direct Mining Drills are available with electric motor drive for underground use.

Augers are in 6-foot lengths that can be quickly coupled. The maximum depth of the drill hole ranges up to 90 feet, depending upon the diameter of the auger and the type of coal.

CARDOX-HARDSOCG
Tractor-Mounted Vertical Drill



One Unit Handles All of These:

- **Rapid Drilling of Stripped Coal**
- **Crop Line Testing**
- **Foundation Testing**
- **Core Drilling**

Here's a whole drilling combination in a single economical package! Furthermore, because of its powerful tractor drive you can use this drill in rugged terrain where use of other types of drilling equipment is difficult or impractical. It saves you time on the job — and between jobs — moves from hole to hole or from one site to another with full tractor mobility. The drill is driven by the power take-off of the tractor engine. It easily drills holes up to 6 inches or more in diameter. The augers are in 6-foot sections, available with any standard connections. The unit can be converted from one type of drilling to another in just a few minutes.

CARDOX-HARDSOCG DRILLS
performance engineered to stay on the job!

Standard
HYDRAULIC HORIZONTAL DRILL

Fast on the job — easily towed or trucked from job to job. When set up in a pit it can be readily moved from hole to hole by the operator and a single helper. Available with either air-cooled gasoline engine or electric motor. Standard equipment includes seven 5¼" diameter, 6' auger sections for drilling up to 42' in depth. Regular hard-surfaced bits or tantalum-tungsten-carbide cutterheads may be used.

CARDOX-HARDSOCG Hydraulic Horizontal Drills may also be had in self-propelled models—gasoline or electric powered.

Standard
VERTICAL DRILL

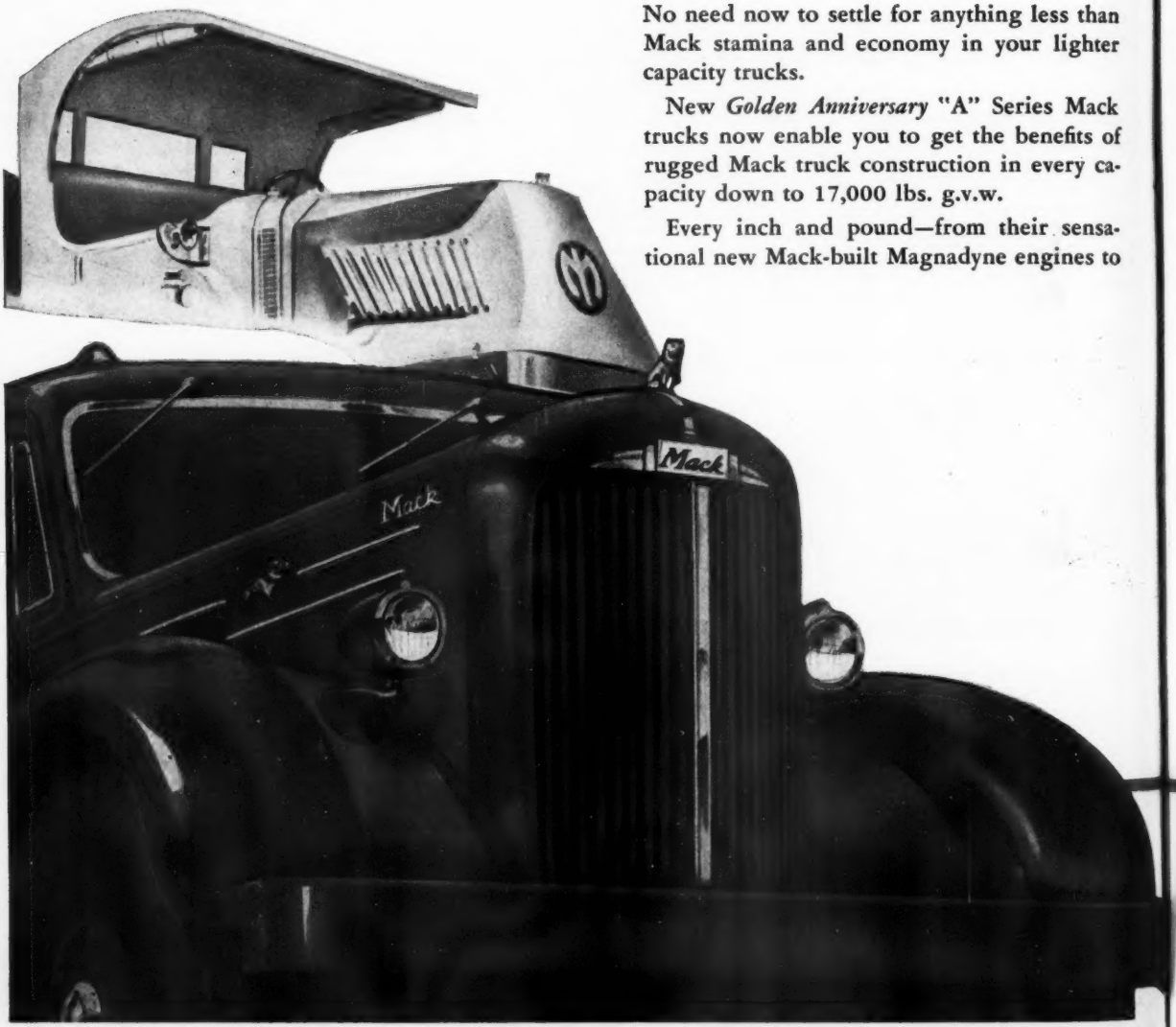
In the production of coal, clay, gypsum, asbestos and other minerals, users report as many as 110 holes, each 10' deep, drilled in a single day! May be had with air-cooled gasoline engine or electric motor. Weight of the engine or motor forces the auger and cutterhead into the material being drilled. The mast is easily lowered for towing from job to job. The 6' augers may be quickly coupled for drilling deeper holes.

CARDOX-HARDSOCG Vertical Drills are also available in heavy-duty model for very tough, deep drilling jobs.

There's a CARDOX-HARDSOCG Distributor or Representative near you. He can help you step up efficiency and cut your costs. Call upon him *first* whenever you need any kind of drilling equipment.

NEW *Golden Anniversary*

Now! Money-Saving Mack before available in Popular



No need now to settle for anything less than Mack stamina and economy in your lighter capacity trucks.

New *Golden Anniversary* "A" Series Mack trucks now enable you to get the benefits of rugged Mack truck construction in every capacity down to 17,000 lbs. g.v.w.

Every inch and pound—from their sensational new Mack-built Magnadyne engines to

MACK TRUCKS

advantages never -Size trucks

their exclusive rubber Shock Insulated spring suspension—these new Macks are engineered in the same high quality Mack tradition as their famous forebears . . . built to handle their hauling jobs with all the enduring reliability and longer life which has marked Mack performance for half a century.

See these great new Macks at your nearest Mack branch or distributor. You'll find that for your lighter hauling jobs, they measure up in every respect to the standards you've grown to expect from dependable, long-wearing heavy-duty Macks.

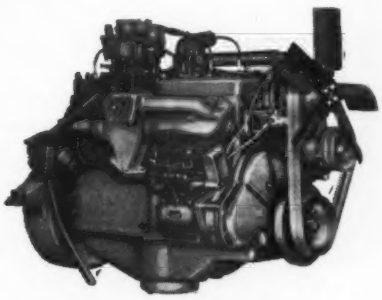
BE PROFIT-WISE

modernize with

Mack TRUCKS

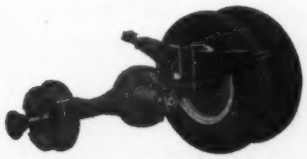
outlast them all

Mack Trucks, Inc., Empire State Bldg., New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N.J.; Long Island City, N.Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



Greater fuel economy . . . longer engine life . . . lower maintenance costs . . . sustained high performance. You get them all in the great new Magnadyne engine—a powerplant designed and built by Mack especially for modern hauling.

Prolonged Clutch Life with less need for adjustment in frequent-stop operations is assured by oversized clutches—one full size larger than customary on competitive makes of trucks.



Broad adaptability to diversified operating conditions is made possible by models which offer a choice of over-geared or direct drive type transmission, as well as axle selection and a range of gear ratios.

Frame stiffness and strength are assured by full-depth side-members braced by cross-members of Mack's box-girder design. Mack rubber Shock Insulators at spring-ends eliminate twisting strain, absorb vibration, require no lubrication or adjustment, last indefinitely.

8553

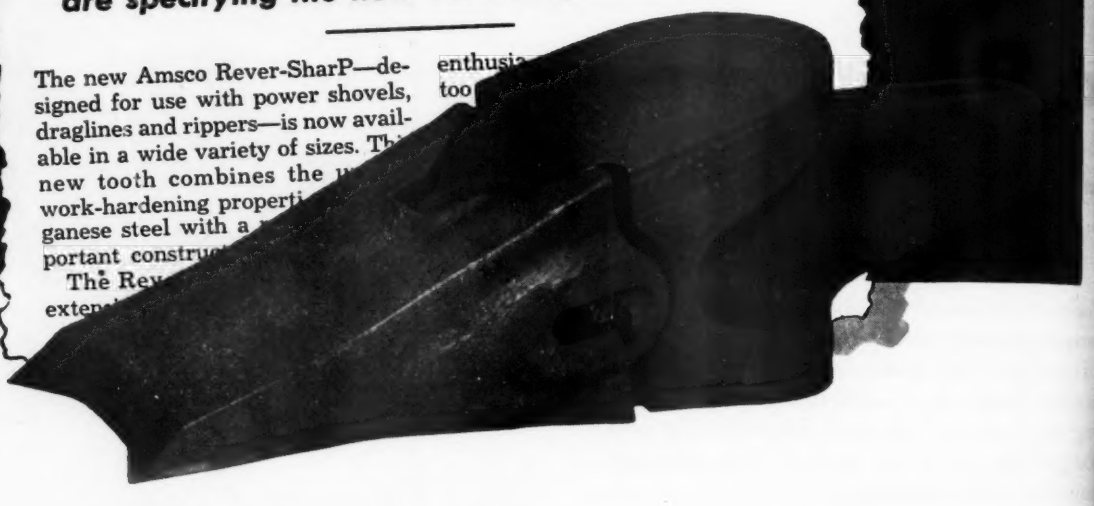
Completely New Tooth Has 6 Major Features

More and more operators of excavating equipment are specifying the new AMSCO® Rever-SharP

The new Amsco Rever-SharP—designed for use with power shovels, draglines and rippers—is now available in a wide variety of sizes. Th... new tooth combines the ... work-hardening properti... ganese steel with a ... portant construc...

The Rev... exten...

enthusia... too ...



1. Manganese Steel Construction throughout—The Rever-SharP actually thrives on hard use . . . *the harder you use it, the harder it gets!*

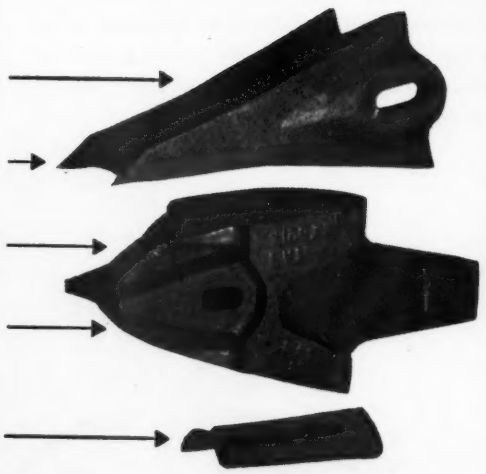
2. Reversible Tip—when the cutting edges of the Rever-SharP are finally worn, simply turn the tip over. *It's self-sharpening.*

3. Reinforced Cutting Edges—specially designed extended corners are the first to work-harden, thus equalizing wear along the entire length of the cutting edge.

4. Heavy, Rugged Adaptor—extra metal protects base connections and lips. Now available for all base connections.

5. Reinforced Adaptor Nose—supported by ribs along entire length, making bending or breakage practically impossible. Special taper makes lips self-tightening during use.

6. Tapered Lock-Key—easy to insert and remove. Has rubber insert—can't work loose in service.



Enthusiastic users of the new Rever-SharP report higher digging efficiency—and as much as 6 times longer tooth life. *It's a new development worth investigating—write today for the complete facts!*

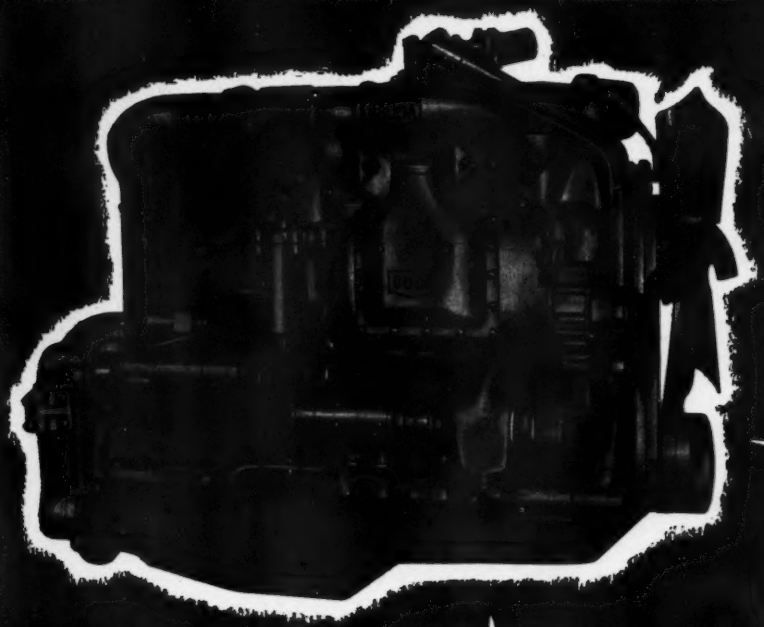
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

422 EAST 14th STREET · CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.

MORE HORSEPOWER, LOWER COST WITH THE NEW BUDA DYNA-SWIRL DIESELS



MORE HORSEPOWER
15-20% more power at the crankshaft.

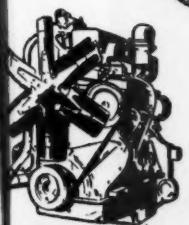
MORE PRODUCTION TIME
Lower exhaust temperatures, extra cooling capacity, positive governor controlled fuel system, Dyna-Swirl combustion . . . means longer engine life, less downtime.

GREATER LUGGING ABILITY
10-15% more torque at normal speeds—smoother, faster operation.

GREATER OPERATOR COMFORT
Quiet, smokeless exhaust . . . less vibration, less gear shifting . . . reduces operator fatigue.

FUEL AND LUBE OIL ECONOMY
Improved combustion, more power per gallon of fuel—less oil dilution, fewer oil changes.

PICK BUDA POWER FOR PROFIT!



3 NEW DYNA-SWIRL DIESELS

Buda's powerful new Dyna-Swirl Diesels are again proving to construction men that "Buda Power is Profitable Power."

Increased power, reduced fuel and lube oil consumption plus less downtime and longer engine life are the advantages and the "competitive edge" you get when you're powered with the new Buda Dyna-Swirl Diesels.

DON'T DELAY! Learn about new Buda Dyna-Swirl Diesel power now. Your nearby Buda Distributor can give you the complete story, or write for circulars and full data. The Buda Company, Harvey, Illinois.

BUDA

New JEFFREY 56-RD ROOF DRILL

(Patent Pending)

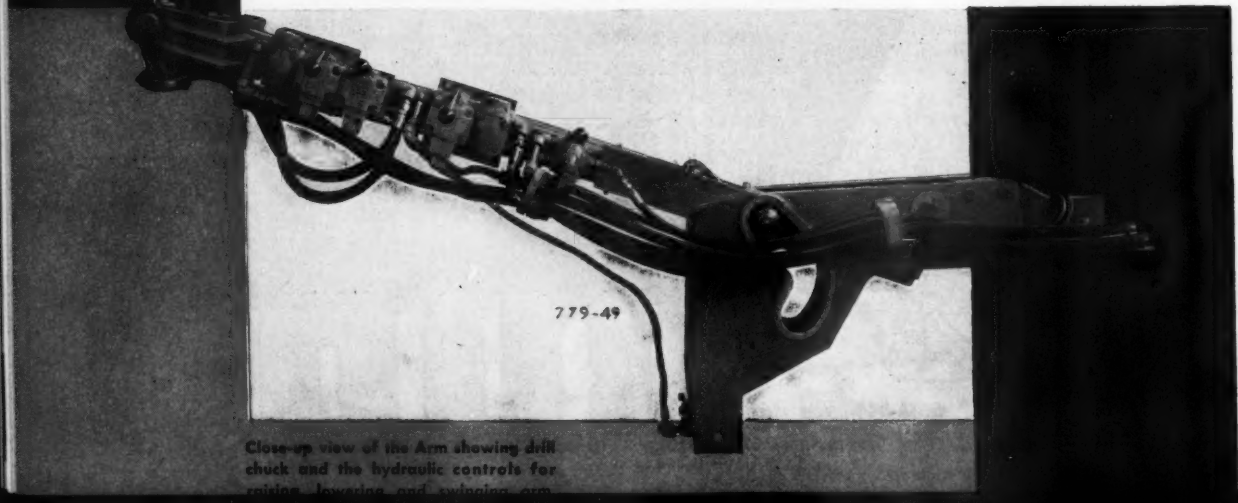
SPEEDS UP ROOF-BOLTING OPERATIONS

● The New Jeffrey 56-RD Roof Drill features a specially-designed Arm, hydraulically operated and mounted on either a self-propelled track type or rubber tired truck . . . provides a reach of 10′ 10½″ each side of center line of machine.

Straight-line feed for the auger and parallelism to its starting position are maintained by means of cams which shorten and lengthen the Drill Arm and make the necessary angular adjustments as Drill is fed upward.

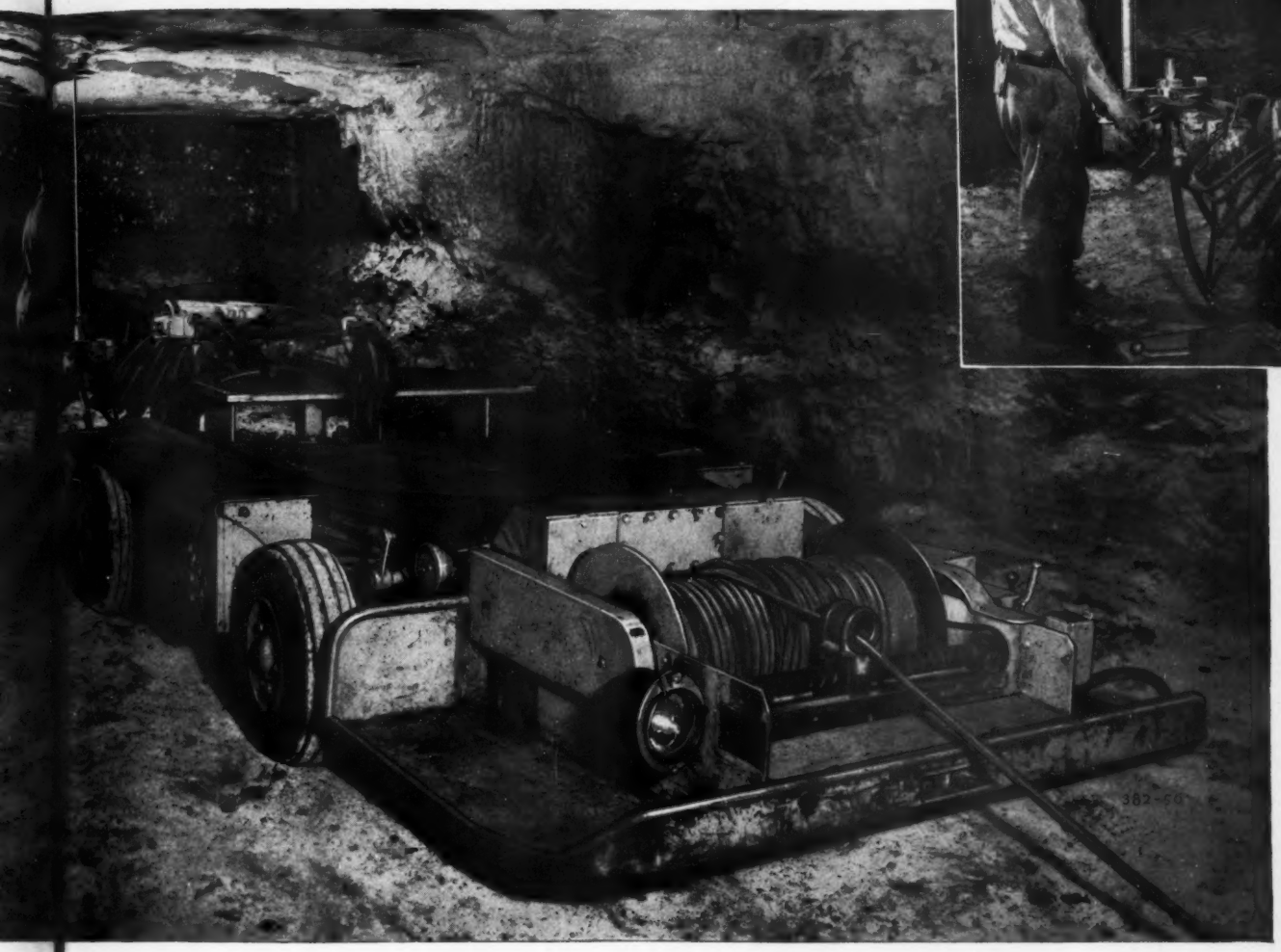
The drill head includes an impact wrench (see inset on other page) for anchoring and tightening the bolts.

If you want to cut costs in Roof Drilling, give our engineers a chance to explain the Jeffrey Roof Drill in detail. Write today.



Close-up view of the Arm showing drill chuck and the hydraulic controls for raising, lowering and swinging arm.

Right—close-up of the Jeffrey Roof Drill showing the impact wrench in use for anchoring and tightening bolts.



Large view above shows the Jeffrey Roof Drill at work. Operator has the auger in the socket and is drilling a roof hole. Water, introduced at drill chuck, is carried through drill rod to drill bit in the hole to prevent dust.

The Jeffrey Manufacturing Company

958 North Fourth Street, Columbus 16, Ohio

Sales Offices and Service Stations in Principal Cities

Cutters	Chains	Continuous Mining Machines	Conveyor-Loaders
Drills	Loaders	Crushers	Tipples
Fans	Underground Conveyors	Shuttle Cars	Feeders
Blowers	Jigs	Locomotives	

Just Off the Press

THE **1950** EDITION

COAL MINE MODERNIZATION YEAR BOOK

ALL the latest coal mining "know-how" is yours in this handy book containing the full proceedings of the 1950 Coal Convention. It's the work of more than 50 top-notch engineers and key operating men. It's crammed with time and money-saving ideas—tells you all the basic facts on new machines, new equipment, new methods—gives you the low-down on safe and efficient coal production and preparation.

The Year Book is the only publication of its kind—the national record of coal mining progress. Every key coal mining man should have one! Arranged in handy-to-use form and fully illustrated, the Year Book can be put to work again and again in helping solve everyday problems arising around the mines.

Order your copy today!

$3.00 per copy
Special Quantity Rate
10 or more copies
$2.75 each

Here's what they said about the 1949 book

"The Year Book is an excellent collection of facts and ideas on important and timely mining subjects."
Chief Engineer

★

"I find it full of interesting and valuable material. I think you are doing an outstanding service to the industry."
Vice President and General Manager

"I have searched the field for a suitable text book and find there is only one book that is suitable. That is your 'Coal Mine Modernization Year Book.'"
Professor—School of Mines

★

"I congratulate the Congress in getting out such an interesting volume."
Asst. Vice President

Published by

THE AMERICAN MINING CONGRESS
RING BUILDING **WASHINGTON 6, D. C.**

BONUS YARDAGE EVERY SHIFT

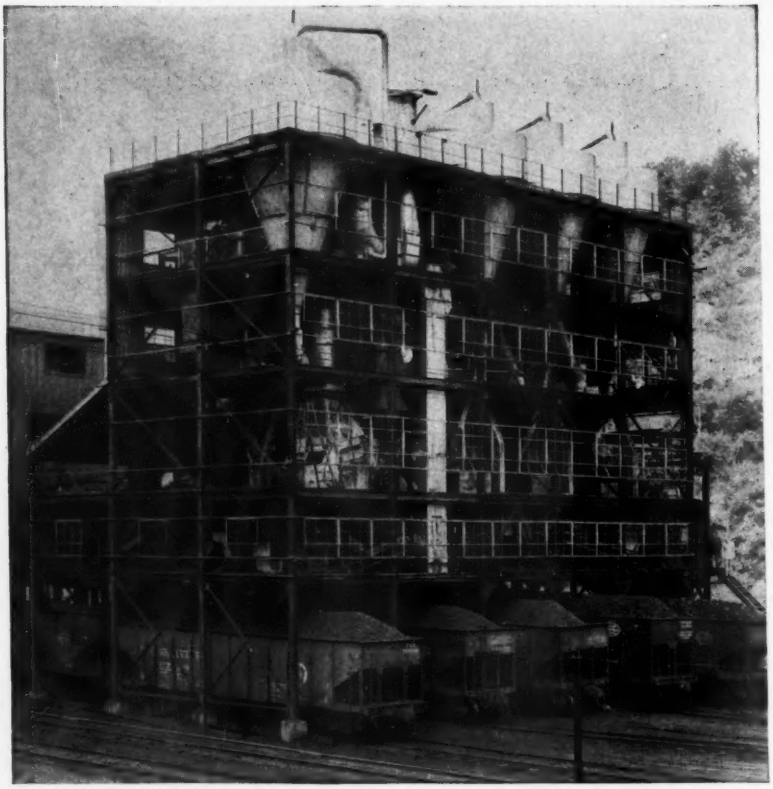
DIGGING overburden that averages 22 feet in depth, and mining a 10-foot bed of Florida phosphate rock, this Bucyrus-Erie 650-B walking dragline is on the job 24 hours a day, seven days a week. Its ability to keep working month after month, through fair weather or foul, has been reflected in the "bonus yardages" that set outstanding production records.

Big dependable yardages are an old story to owners of Bucyrus-Erie stripping shovels and draglines. Owners know that fast, smooth operating cycles combined with on-the-job reliability mean extra output every shift . . . that sound, *years ahead* design and durable construction mean dependability that takes years of hard service in its stride. 98LSO

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

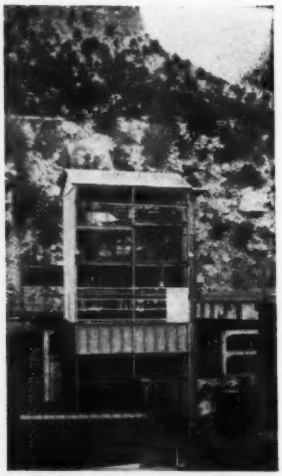
In planning for the future see what Roberts and Schaefer Super-Airflows are doing RIGHT NOW!



"Skeleton View" of Roberts and Schaefer - equipped dry cleaning plant at Trotter Coal Company's Bunker Mine, Cassville, W. Va.—photographed before steel siding was installed.

PREPARATION PLANTS NOW IN OPERATION SHOW

HOW TO DRY CLEAN LARGER COAL SIZES



R&S-equipped dry cleaning plant operated by Lion Coal Corp., Wattis, Utah—photographed before steel siding was installed.

Research in the field of dry cleaning coal has moved so fast that it's hard to realize what great strides have been made. But strides have been made . . . and the two air cleaning plants shown on this page are eloquent evidence of that fact.

Air cleaning up to 1¼-inch coal. Improved position in steam-coal market . . . raising shift capacity from 1700 to 2600 tons. That is a report on the R&S Super-Airflow units at Trotter Coal Company's Bunker Mine Plant, Cassville, West Virginia. (Illustrated above.)

Successful dry cleaning of sizes up to 1⅝-inches . . . ordering a second R&S Super-Airflow to double plant capacity: Lion Coal Corp., Wattis, Utah. (Illustrated at the left.)

Entire mine output crushed to 1¼-inches and dry cleaned by Roberts and Schaefer Company Super-Airflow units . . . reports American Eagle Collieries of Southern West Virginia.

A good idea: When you are looking for future improvements in dry cleaning of coal, do as these companies did—consult with Roberts and Schaefer Company.

ROBERTS and SCHAEFER COMPANY

130 N. Wells Street, Chicago 6, Illinois

1314 Henry W. Oliver Bldg.
PITTSBURGH 22, PA.

P.O. Box 570
HUNTINGTON 10, W.VA.

254 West 54th Street
NEW YORK 19, N.Y.

Editorials

SHELDON P. WIMPFEN, *Editor*

Will There Be Time?

IN mid-August it was revealed that less than twenty percent of stockpile needs had been realized as to nearly a dozen stockpile items, including manganese, lead, copper, tin, zinc, aluminum and magnesium. As to some thirty-four other items we are fifty percent short of stockpile goals.

One reason given for this alarming condition of the stockpile is that the Government has been trying not to interfere with domestic civilian requirements nor disrupt industrial supplies. Stockpile progress reveals that this aim is difficult to achieve.

Complexities of the problem are magnified to huge proportions by the many burdens imposed on domestic mining. A tax program that fails to consider the very nature of mining, together with a price structure imposed by foreign producers operating under a relatively low standard of living, have combined to force domestic mining in various fields into a state of decline.

To alter this dangerous drift, action to encourage production of our natural resources has been urged repeatedly on these pages. In August 1948 it was said that "Our natural resources are the building blocks. They must be ready to be laid up in a form to suit the current need at any given time. . . . A stockpile of such blocks is being gathered now—albeit at too slow a rate—by a Government that has too often disregarded mineral industry problems."

Today the need for a stockpile of adequate proportions is more urgent than ever. Already we are engaged in a costly war in Korea and face the threat of military effort on a broader scale. Still there is quibbling and dawdling over adoption of a sound over-all mineral policy that would revitalize the industry and provide ample quantities of minerals and metals for the stockpile.

Six major changes required in the tax structure as applied to mining, to bolster languishing exploration and development, have been recommended by the National Minerals Advisory Council and the American Mining Congress. These have, in large part, been incorporated in Canadian tax law with beneficial effect on Canada's mineral supply and increased tax revenue to its treasury.

Prompt revision of tax laws affecting mining will aid in reversing the declining trend of domestic mineral output. Study the following comparison of the treatment accorded mining in the United States and Canada. Incorporation of the NMAC program in our tax structure would remove some of the shackles on domestic mining and augment the flow of minerals and metals. There may yet be time for domestic mining to make substantial additions to the stockpile.

Treatment Accorded Mining:

IN THE USA	IN CANADA
TAXES are imposed on mining income at once, often on assumed profit without known and proven ore to assure recovery of investment.	NEW mines are entirely exempt from taxation for first three years of operation. An additional six months period of tax-free operation is allowed for "tune-up."
All development and preliminary costs, until a mine reaches the "production stage," are required to be treated as capital expenditures recoverable only through depletion allowances.	Expenditures for prospecting, exploration and development are deductible from taxable income as operating expenses. These charges may be deferred until expiration of the tax-exempt period, and then written off at any rate in any one year, from zero up to a maximum of 25 percent.
Depletion allowance for metal and some nonmetallic mines computed at 15 percent of "gross income from the property" but not more than 50 percent of "net income from the property." Over a period of years, these provisions frequently reduce actual depletion allowances to materially less than either of these percentage standards.	Depletion allowance at rate of 33⅓ percent of net annual earnings. In the case of mines with the valuable production derived from gold to the extent of 70 percent of the total output, depletion allowances are established at 40 percent of net annual earnings or $4 an ounce of gold produced, whichever is greater.
Capital gains subject to substantial tax.	Capital gains not taxed. Profits of bona-fide prospector or prospecting syndicate from sale of mine considered as capital and not subject to tax.
Double taxation—first on corporate income and then on this same income again when distributed to stockholder in form of dividends.	Depletion allowances granted to shareholders of 10-20 percent of the dividend.
Operating loss in any year may be "carried back" two years and "carried forward" two years, but in so doing the taxpayer is denied the benefit of percentage depletion, both for the year of loss and the year to which the loss is carried.	Operating loss in any year may be "carried back" one year or "carried forward" five years. No disallowance of percentage depletion.
Losses from fruitless mining ventures in many cases can only be written off as tax deductions by abandonment or sale of the property, with many questions as to when abandonment may be recognized or loss on sale may be deductible.	Losses from fruitless ventures deductible from taxable income in year of loss.
"Straight-line" or unit depreciation to be written off each year, including loss years when no tax benefit can be realized.	"Diminishing balance" depreciation may be taken at such rate in each year as taxpayer chooses, from zero to 30 percent, based on the undepreciated balance. Full application of the tax benefit principle.

Fig. 1—St. Joe Shovel loading shuttle car

Trackless Mechanized Mining In the Lead Belt

Tread and Tire-Mounted Units Prove Successful in Open Stope Operations

By R. T. MURRILL and PETER B. NALLE

General Mine Superintendent and Mine Engineer, Respectively
St. Joseph Lead Co., Bonne Terre, Mo.

FACTUALLY trackless mechanized mining by the St. Joseph Lead Co. in southeast Missouri dates back to the time when the mechanical shoveling machine was introduced during World War I. From that date on the gradual steps have brought about complete mechanization in some form of the drilling, loading and hauling operations. All loaders then and today, were mounted on crawler traction treads. This might be considered the first step in trackless mining.

Ore bodies in the district are adaptable to either the track or trackless mining methods. They are almost all flat lying, although, locally many sharp dips and rises may be encountered. The thickness of the ore varies from a few feet to over 100 ft. Haulage levels are maintained near the bottom of the general trends of the ore bodies. Upper levels are reached by raises or steeply connecting drifts. One of the problems of the district is the discontinuity of the ore bodies. Unlike coal mines or limestone mines, it has been impossible to delineate the ore bodies in advance of mining. Rough outlines and elevations of the ore are obtained by diamond drilling on 200-ft centers generally in most sections, while 100-ft centers serve in some sections and 50-ft centers are required elsewhere; until the actual mining is finished the shape of the ore body is unknown.

In a normal stope, ground is broken by drilling slab holes with a post-mounted, wet machine. In high ground a breast line is advanced ahead of a bluff, which is then broken by lifters and splitters. All stopes can be classed as room and pillar stopes. No timber is used and bad back is supported by roof bolts and channel irons. Pillar

spacing varies from 18-40 ft in the clear. The average pillar diameter is about 15 ft in the present operations.

Most of the mining equipment in use is standard.

Flat-lying replacement ore bodies of the Lead Belt of southeast Missouri are mined efficiently with mobile, rubber-tired equipment. Many of the mechanical mining units, originally developed for coal mining, have been specially adapted to rock handling. Here are the details of the various types of machinery used and their application to systematic mining methods.

Trackless Loaders Place Ore in Cars

In a regular stope, heading ore is loaded directly into mine cars of either 2.7-ton or 12.5-ton capacity by mechanical loaders. By far the largest proportion of mechanically loaded ore is handled by St. Joe shovels. These shovels, developed by the St. Joseph Lead Co., have proved satisfactory for over 25 years, both from the standpoint of economy and from ease of operation. The cars are spotted at the shovel by gathering locomotives. When a train of ore has been loaded a main line locomotive hauls the ore to one of the operating shafts in the district. The average haul from heading to shaft is about 2.2 miles, but some hauls are as long as 6.4 miles.

The St. Joe shovel is an electric powered, boom type shovel with full revolving turntable. It is mounted on heavy crawler traction treads and weighs about 15 tons. This type shovel handles about 3,950,000 tons of ore per year. (See Fig. 1)

Dragline Scraper Loaders Serve Some Stopes

The second step in trackless mechanization came with the advent of scrapers to the district. With complete conversion to the mechanical loading equipment by about 1930, it became necessary to find some method of loading ore in stopes that were above the main mine elevations. Such stopes were, in general, flat and of limited extent, not justifying either a new operating level or a long drift to gain the necessary elevation. The standard two or three-drum scraper has provided a solution to the problem for many years and is economical for distances up to 250 ft of drag.

The third trackless step was made when the Rogers Ramp was introduced into the district in 1947. The Rogers Ramp is a portable carloading scraper machine produced in the Joplin District. The ramps are mounted on crawler treads and powered by air or electric motors. A 40-hp, three-drum hoist is mounted on the ramp and a 48-in. open hoe is used to drag the ore. These ramps stand about 7 ft 6 in. high when knocked down for moving. When loading, 11 ft of head room is required. About two or three moves per day are made and the ramps currently average about 150 tons of ore per shift. These ramps are generally considered satisfactory when operating in areas where long moves are not required and are consequently limited as to tonnage available. Two of these ramps are in use in Mine No. 19 and have handled 150,000 tons of ore since their installation.

A further development of this idea was brought out in 1949 by making a unit to operate in lower headroom and possibly be more portable. A standard St. Joe drift-cleaning railroad ramp was taken off its 24-in. gauge track chassis and mounted on a Joy, air-powered, rubber-tired jumbo chassis. A 25-hp, three-drum hoist was used with a 54-in. hoe. To date this new unit has been used on an upper level of the National Mine to load in development and mining headings and is currently loading about 175 tons per shift. This unit, ramp-mounted on rubber tires, has several advantages for use in off-level stoping and in small isolated places. It is simple in design, comparatively cheap in first cost and can be operated by the breaking crew. For example, a crew of two men after drilling and breaking their rock can move the rubber-tired ramp into position and themselves load the rock. For haulage, a shuttle car is provided in this first installation.

In practically all cases, except on the two ramps mentioned above, scrapers are used not as an alternative to track, but as an expedient to make mining possible where the use of track was impracticable. When the portable ramp loads into a shuttle car, the operator stands at a safe distance from the machine using a remote control. (See Fig. 2)

Jumbos Are Standard Equipment

During the past 15 years various types of jumbos and drill mounting rigs have been tried in the area with indifferent success. Some were too bulky, others not rigid enough and most were mounted for use on tracks. Not until 1946, when the first crawler tread mounted jumbo was introduced into the Leadwood Mine, did the jumbo come into general use. The jumbo, of which there are now 14 in operation, is one of the standard pieces of trackless mining equipment.

The 1946-47 jumbos were powered by one air motor and moved on crawler treads. The arms were lifted hydraulically and swung and extended by hand. Later models use the Joy Hydro Jib and are rubber-tire mounted. They are powered by either electric or air motors.

In addition to its primary purpose as a rock breaking machine the new jumbo is useful for taking down sections of the back and other work. (See Fig. 3)

Fig. 2—Portable scraper-ramp loading a shuttle car

Diesel Powered Trucks Operate Successfully

The first underground items of trackless haulage were Dart trucks with 100 hp Cummins Diesel engines pulling Landis ten-ton semi-trailers. They were of same type as used by the Eagle Picher Co. in the Joplin District at the time. These trucks were installed at Mine No. 19 in 1947. The semi-trailer unit operates most successfully when ample turning space is available and where too much backing is not required through long haulage drifts. In 1948 the trailer was changed to a dump body placed on the rear truck chassis; a standard Gar Wood 2½-ton with hydraulic lift.

Oxygen injection to the exhaust manifold and scrubbers on the exhaust gases have both been used on the Diesel engines. Apparently one of the chief factors governing air pollution seems to be the adjustment and maintenance of the Diesel motors. The mine in which the trucks are used is shallow and ventilation is not a serious problem. Two supply shafts and several churn drill holes with blowers are used for air supply. The hoist shaft is upcast and the total air supply of 25,400 cfm is enough to keep the exhaust gases diluted and well within the safe limits. A minimum air velocity of 50 fpm is maintained in all operating headings.

The trucks have hauled 175,000 tons of ore to date on an average haul of 400 ft with a maximum haul of 700 ft. They have operated against 6 percent grades. Standard, readily obtainable parts are used for repairs. About six tons constitutes a pay load. One disadvantage of the trucks is the height required for loading and dumping. Nine feet of clearance is required for loading and 11 ft is required above the car or point of discharge for dumping. Further tests with Diesel-driven equipment are planned for well ventilated sections of the mines.

Shuttle Cars Aid Selective Mining

The introduction of the shuttle car in 1947 was an attempt to eliminate entirely most of the tracks in the operating headings.

In addition to the heading motorman and shovel operator, there is generally a trackman working full time in the larger stopes and part time in the smaller stopes replacing, building and moving track. Also, most of the loading machines, in order to load efficiently, must have track within 30 ft of the broken ore.

By necessity, track in a stope ties up a certain amount of ore which is used for ballast and cover to keep the track from being blown out during blasting. It is troublesome to reclaim this ore and to remove the rail when the stope is finished. Finally, it was hoped that the introduction of trackless haulage equipment would give the mine foremen better opportunity to practice more selective mining. It was felt that the trackless equipment would give the operators greater freedom in choice of haulage grade and direction so that the vagaries of the ore could be followed.

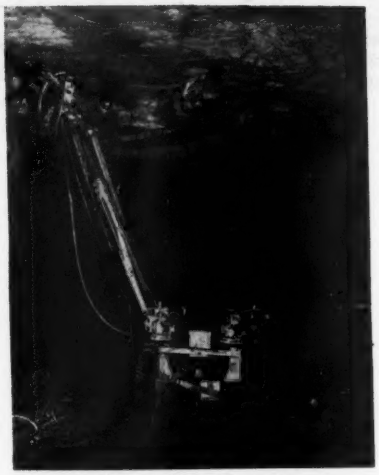


Fig. 3—Rock drill jumbo taking down high back

Movements of ore over the long haulage distances to the hoisting shafts will still be handled by rail. The long hauls for the main line haulage system are the result of the consolidation of the milling and hoisting facilities in the area. With the exception of certain areas and outlying mines, trackless mining was never intended to replace the main line haulage system. The introduction of 12.5-ton mine cars in place of 2.7-ton cars has done much to improve the efficiency of this haulage.

The first shuttle cars purchased were Joy, type 60E, d-c operated, 12-ton cars. The over-all dimensions of these cars are large for some of our operations; length 24 ft, width 8 ft, height empty 54 in., weight 24,000 lb.

Present standard haulage drifts in the area are of ample size for moving the shuttle cars. However, in the older sections of the mines, many drifts are of inadequate cross-section and have curves which were not laid out for the long equipment. Many haulage drifts have large water ditches along one side and others have pipes and power lines in close places. These factors hinder the rapid movement of shuttle cars from stope to stope; a feature vital to the production of the necessary tonnage from each unit if it must serve several stopes.

Thus, it became apparent early that a stope or group of stopes accessible to the shuttle car must have a fairly long life, otherwise, the cost and time required to dismantle, move and reassemble the shuttle car could not be justified. Furthermore, when only a few headings were available to the shuttle car it could not approach its rated capacity.

One typical long-life stope in the Leadwood Mine has kept a shuttle car continuously since March 1948 and has produced 124,158 tons of ore to date. (See Fig. 4) The shuttle car discharges into 2.7-ton mine cars from a stationary inclined ramp, built of timber and loose rock to the height of the mine cars. The ramps, whose location is indicated on the figure, are standard throughout the mines in which the Joy 60E shuttle cars are used to dump directly into mine cars. The mine cars are spotted at the ramp by means of a cable attached to a car puller which in turn is operated by a remote control mechanism

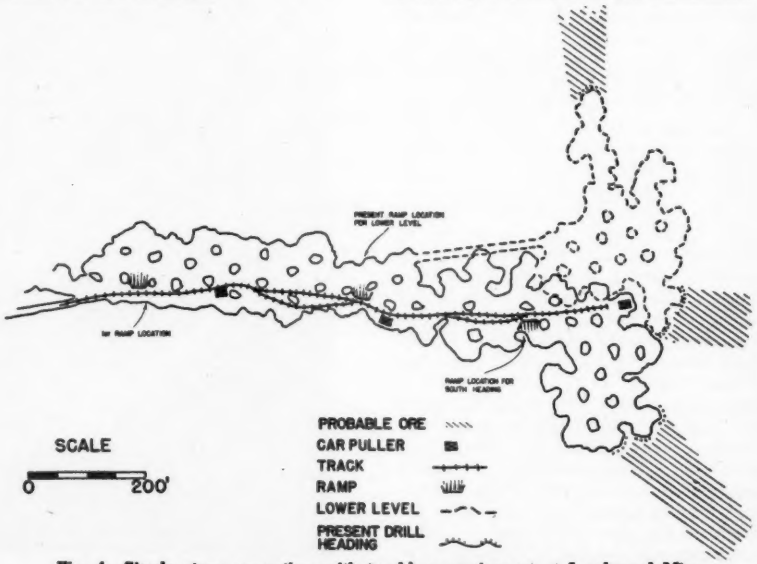


Fig. 4—Single stope operation with trackless equipment at Leadwood Mine

located at the shuttle car operator's station. The maximum haul in this type of stope operation to date has been about 750 ft. When the haul became too long for good loading, the loading ramp was rebuilt closer to the working faces as indicated.

Transfer Trucks Move Shuttle Cars

Large, long-life stopes as described are not common in the area today. As an alternative to one large stope, several smaller stopes have been connected by drifts suitable for the passing of the shuttle car. In some instances old drifts were used by covering ditches, slabbing curves and raising power and pipe lines above the height of the car. In these drifts the car can straddle the 24-in. gauge track when moving from one stope to another if the distance is short. Whenever the move is long and when the drifts will permit transfer trucks are being provided. A transfer truck with a shuttle car on it is pulled over the mine tracks by a locomotive. If the stopes are not connected by tracked drifts the shuttle car must, of necessity, travel the entire distance under its own power.

The development of a large number of stopes in a limited area has proved fairly successful. (See Fig. 5) The plan allows advantage to be taken of the mobility and potential capacity of the shuttle car and loading unit, as well as mining a large number of relatively small ore bodies in an efficient manner. Generally, several loading ramps are used to shorten the shuttle car haul. Careful planning is required to avoid moving the shuttle car and loader needlessly. Although the moving is not excessive (about one hour for a shuttle car and its loader on a shovel truck), it is generally done on operating time and represents a loss of loading capacity.

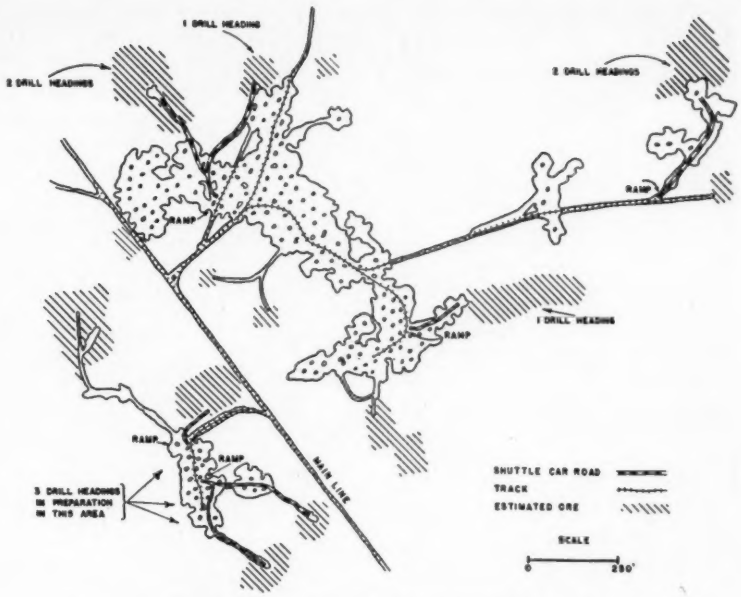


Fig. 5—Small stopes grouped for shuttle car service at Leadwood Mine

A third means of utilizing the advantages of the shuttle car and minimizing the moving disadvantages has been to employ a smaller shuttle car which can more readily be moved on a transfer truck over the mine rails from one stope to another. Late in 1949 a Jeffrey car of such design was purchased. The dimensions of this shuttle car are: length 24 ft 6 in., width 6 ft 6 in., height empty 48 in. The car has a rated capacity of seven tons, and uses a conveyor to discharge the ore. Unlike the Joy 60E, the Jeffrey car does not need a ramp for discharging its load of ore. The conveyor can be elevated to 62 in. at the discharge end, allowing the car, while on the stope floor, to load directly into the mine car. (See Fig. 6) This car and its special moving truck, which allows 24-in. transverse motion over the track center line, can be moved through some of the smaller drifts without dismantling the car. As yet the smaller capacity of the shuttle car has proved to be no disadvantage. The ability of the car to unload anywhere and the ease and speed of moving have apparently compensated for the smaller size. The car has been used on hauls under 350 ft to date.

Fig. 6—Shuttle car with elevated conveyor discharging into mine car

The types of operations described so far are ones in which the shuttle car discharges into mine cars. Whenever a small mine must hoist its own ore the cost of cars, car dumper and track installations represent a considerable investment. For these reasons, as well as the previously mentioned advantages, some of the smaller outlying mines are now operating on an entirely trackless basis.

(Part II will be published in the October issue.)

Mine foremen and other supervisory personnel come under the plan

Pensions for Supervisory Employes

How One Company Solved the Problem of Providing for Over-Age Workers

By C. N. CRICHTON

Secretary-Treasurer
Johnstown Coal & Coke Co.

THERE is nothing new about pensions in industry. Some 8000 - 9000 plans have been approved by the Bureau of Internal Revenue and several of the larger and more progressive coal companies have had plans in effect for their supervisory employes for quite a few years. Most coal producers didn't do much about the matter until Messrs. Lewis and Krug signed their 1946 agreement which for the first time established a Health and Welfare Fund for members of the United Mine Workers.

In common with most employers, studies had been carried on for some years of the problem of what to do with superannuated supervisory employes. Several men had been retired on fixed pensions determined almost solely on the basis of immediate need rather than by reference to any survey of future cost or liability for an over all pension program. With no funding or reserves established, these pensions were simply paid over the payroll. Meanwhile, other men were continued in employment even though some of them in the interest of maximum efficiency should have been retired. Thus, there was in effect the simplest form of un-funded pension together with many of its weaknesses. A funded plan, of course, is one involving a definite program of earmarking or segregating cash, generally following some systematic schedule, to meet such present and future pension liabilities as may be calculated to exist.

Late in 1947, the Board of Directors authorized a study looking forward to adoption of a more formalized, funded plan for supervisory and other company employes. They expected a final report would be forthcoming and a fund established within a matter of weeks. Actually, the matter was still under discussion a year later.

As many thousands of business executives have learned by this time, pension planning is a complex matter and a plan that may admirably suit one company may be completely unsuited to another—problems and conditions being different. In describing this plan and some of the problems faced in reaching decisions as to its details, there may be something helpful to those faced with the pension problem.

Funded Plan Preferred

As the weaknesses of the un-funded plan had been recognized some years back, the decision to use a funded

plan was neither difficult nor delayed. Not only did the funded plan appeal to the management from the standpoint of its greater desirability and protection for employes but also because of its tax and accounting features. How much better it seems to have a plan whose present and future costs can be known, not exactly, of course, but rather definitely. And once the decision has been made to provide pensions it seems wise to use the method which in the long run will be the least expensive. This led directly to the funded plan.

Once this decision was reached, a far more difficult problem lay ahead in deciding what type of funding to use. This question cannot properly be solved until most of the facts concerning company and employes are developed and until most provisions of the plan itself are decided upon. With all facts at hand, in one set of circumstances, the advantages of an insurance plan may be obvious or in another, a trust fund may be preferable.

Coverage and Benefits

First, as to coverage, every present full-time employe of the company who has been employed for one year and is not or will not be entitled to a UMW pension is eligible to participate and receive benefits. In effect this includes all supervisory, clerical and technical employes who are commonly classed in the industry as "exempt." The only exceptions are part-time or temporary employes and several top officials who were omitted primarily for cost reasons. In connection with the provision that only those employes are eligible who have been employed for one year, it may be stated that, for administration reasons some waiting period before attainment of eligibility is customary in industry pensions. By increasing the length of this waiting period, the cost of the plan can, of course, be reduced and many companies use a period of as long as five years. In this case, after a final review of prospective costs, it was decided to limit the eligibility waiting period to one year rather than to provide certain other benefits which might have been given.

Second, as to benefits, the plan calls for a past service credit of 1 percent of total earnings during the year 1947 (the last full year prior to adoption of the plan), multiplied by the number of years of continuous service prior to January 1, 1948 (the effective date of the plan) excluding the first year of service with the company. The future service benefit is slightly more liberal than past service, amounting to 1 percent of the first $3,000 of annual earnings and 1½ percent of the excess over $3,000.

Although on first impression this seems a rather complicated formula, it is a type rather commonly used today and should present no serious difficulties to the employe who is sincerely interested in making an approximate calculation of his possible prospective pension. This type of formula appeared to have obvious advantages over the fixed benefit type which awards the same pension to all eligible employes regardless of variations in years of service and income.

To illustrate the application of the benefit formula to a specific case, the following example is cited: An employe 45 years of age who has worked ten years for the company, had earnings of $4500 in 1947, (the base year for calculation of past service benefits) and expects to receive an average of at least $5000 per year until retirement at age 65. The calculation is made as follows: 1 percent of the 1947 earnings of $4500 amounts to $45.00. This is multiplied by nine which produces an annual pension credit for past service of $405.00. The figure nine comes from deducting the one year eligibility waiting period from the total ten years of past service. Then for future service, 1 percent of the first $3000 of expected average earnings amounts to $30.00. 1½ percent of the excess over $3000 which is $2000 amounts also to $30.00. The total of $60.00 multiplied by the 20 years of expected service between ages 45 and 65 produces an annual pension credit for future service of $1200. Adding the past service and future service credits produces a total annual pension of $1605 which, expressed on a monthly basis, amounts to $133.75. This is exclusive of Social Security or other Government benefits.

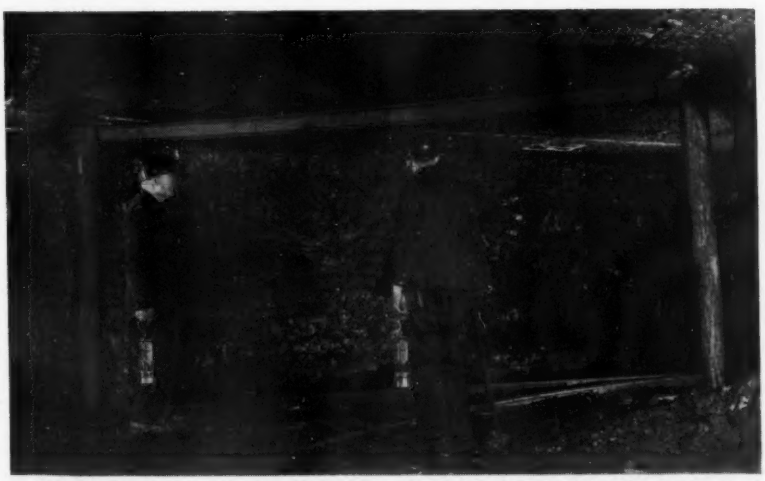
Although this formula results in pensions of less than $100.00 per month for employes with short service, low earnings or both, it was set up to produce a pension of approximately $100.00 per month for the assistant foreman who retires with 20 years' service. This was the man considered to be the average man in the supervisory and clerical family and whom should be treated at least as well as the UMW member.

Being keyed both to income and years of service, this formula produces pensions of more than $100.00 per month for the assistant foreman with more than 20 years' service as indicated in the illustration or for the higher paid employe who has 20 years' service and in some cases less. Including Social Security benefits, this formula will produce pensions ranging from 35 percent to 70 percent of final earnings depending, of course, upon length of service and average income levels.

Non-Contributory Plan Adopted

After lengthy deliberation on the controversial question of employe contributions, a non-contributory plan was selected. Although the fact that the UMW pension was non-contributory was one of the points considered, this was not a controlling factor in the choice of plan. Original thinking favored the contributory type plan. Advocates of employe contributions hold that this type provides more satisfactory benefits, is less paternalistic, encourages employe thrift and that the employe gains a realization of the cost of the benefits. It was held that a more satisfactory benefit could be provided if the employe shared the cost.

One of the first things discovered about the contributory plan, however, was that contributions have to be refunded where the employe, for any reason, leaves employment prior to attainment of retirement age. In the experience of most companies only a relatively small percentage of employes normally will ever receive pensions because the majority terminate



In determining the amount of the pension, the status of the assistant foreman was taken as the median

employment before they reach a pensionable age. Accordingly, it is obvious that, even under the contributory plan, the employer will pay all except a very small portion of the cost of pensions which are ultimately paid and will additionally be required to do the work in connection with the handling and refunding of contributions to those who never become pensioners. As turnover had been fairly high and with uncertain times ahead in the industry, it seemed wise to accord more than average weight to the matter of the cost of refunding employe contributions.

Also, the contribution of an employe is not deductible from his taxable income. The employe, therefore, has to pay taxes on income from which he receives no immediate benefit. Because of this tax angle and because reserves have to be maintained to refund amounts to those contributors who may at any time leave their employment, the dollars paid in by employes under a contributory plan buy far less in terms of ultimate benefits than those paid in by an employer under a non-contributory plan.

The non-contributory plan therefore seemed less costly to administer and fairer to employes. In addition there seemed an advantage in that all employes would be automatically covered whereas this would not necessarily be true under a contributory plan. A final reason was that a company bonus plan which had been in effect for some years was to be discontinued. Had employes been asked to contribute they would, in most cases, have suffered a double reduction in take-home pay. The non-contributory plan may not be at all suited to the circumstances of other employers but was adopted because it seemed to fit the local problem.

Vesting and Other Provisions

A "vesting" provision is included in the plan. This is a feature that permits the employe to attain some equity in the prospective future benefits following a certain period of employment but prior to actual attainment of normal retirement age. Without such a clause, an employe could be denied a pension after as much as 40 years' service, if not actually employed on the date he attains his normal retirement age. Although no right thinking employer would do so, the employe has no contractual assurance in the absence of a "vesting" provision, that his boss will not discharge him prior to attainment of his retirement age for the purpose of saving the pension.

This "vesting" clause is moderate in providing that an employe following his 40th birthday or tenth year of continuous service, whichever is later, will receive for each succeeding year a credit of 5 percent of the pension benefits accrued to that date. Under this formula limited benefits are earned until rather long service has been rendered, with no pension benefits payable until age 65, but the disadvantage of having no "vesting" whatever are obviated.

Various optional benefits are permitted under the plan. Should the employe choose, he may elect to receive a reduced pension with the understanding that in the event of his death, following retirement, his wife or other beneficiary would continue to receive some payment for the duration of their life. Otherwise, of course, the pension would cease upon his death.

Normal retirement age for men is 65 and for women, 60. Under certain circumstances, with the approval of the Retirement Committee, early or delayed retirements are permitted although it has not been the policy, thus far, to approve extensions in employment. The plan includes no benefits in the event of death but life insurance is provided under a separate contributory group insurance plan. It has been the policy to continue to carry, for retired employes, half of the insurance on their lives which had been carried prior to their retirement.

Although the company has every intention of continuing the plan indefinitely, no guarantee has been made to continue payments into the fund and the company has reserved the right to modify or amend the plan should that appear necessary. Should payments be suspended for any reason or the plan be cancelled, provisions are carefully drawn to prevent monies already paid in by the company from ever returning to the company. All of the funds of the plan must be used only for the benefit of eligible employes, retired members or their beneficiaries.

Administration by Committee

There are three main types under the classification of funded plans; (1) group annuities, (2) individual insurance policies and (3) trust fund plans. Representatives of insurance companies have much to say in favor of the two former types just as trust officers can give many convincing arguments in favor of the latter. Each system has distinct benefits depending upon the facts concerning the group to be covered and the circumstances and desires of the employer.

The choice of a trust fund plan was motivated solely by the thought that certain advantages in that type were best suited to local circumstances. Many arguments could be cited pro and con on this subject. But the trust fund seemed somewhat more flexible considering the provisions incorporated in the plan and the possibility of future amendment and change. Also it is hoped that this plan will be less costly.

Administration of this plan has been relatively simple. A corporate trustee invests and handles the pension funds. An actuary assisted in setting up the plan in obtaining Treasury approval and guiding the preparation of the original announcement booklet. He periodically examines employe data to assure an actuarially sound fund.

A Retirement Committee consists of three members, all company executives. This might not be the most desirable arrangement, at least from the standpoint of employe relations, but thus far it has worked with success. In the early stages of the plan the greatest task of the committee has been to discuss and settle cases involving interruptions in employment. For example, 20 years ago Jim Smith left the company for six months, then returned, having worked continuously ever since. If it is determined that Jim went to work for another employer, in most cases he will be checked as being a new employe from the date of his return. If it is discovered that he was sick or that a layoff occurred due to temporary lack of markets, the chances are he will be checked as having had an approved leave of absence with no interruption in the continuity of his service. These problems are mostly ones which require little more than fact finding.

This work has been an interesting and rewarding task for all who have served on this committee. Certainly it has provided a new appreciation of these old timers who have been with the company so many years.

A dozen employes are already retired and are enjoying the benefits of the plan. Although some of the early pensions have been supplemented with additional payroll funds, this does not necessarily indicate a weakness in the plan as no formula can be rich enough to pay a handsome pension to every employe regardless of average earnings or length of service. This plan suits the company because it doesn't saddle the organization with a rigid future contract. Although no employe can lose the benefit of any step taken thus far, the plan may be curtailed or strengthened at any time necessary.

There is no easy road to adoption of the proper pension plan for any company. It would seem to require the employment of impartial, trained consultants or, as an alternative, that intensive research and study be engaged in by company executives. In any event, and whatever plan adopted, it goes without saying that amendment and revision will likely be necessary in the future. Because it is perfectly possible and indeed most desirable to adopt a flexible plan, the probability of revision should not be a deterring factor to companies now considering pensions. A well planned, properly administered program can be a considerable asset to an employer.

Perpetuation of the Domestic Mining Industry

Trend of Metal Production, Wages and Prices

By PAUL H. HUNT
Vice-President and General Manager
Park Utah Consolidated Mines Co.

DURING the past 20 years the domestic mining industry has maintained production, in most cases at the expense of its health. Now the industry is being hurried to reach a decision regarding perpetuation of mining beyond the life of the present low cost producers.

Many companies were forced by the depression of the 1930's to curtail exploration to remain solvent and the shortage of manpower during the war years forced a continuance of the same policy. Then, after 1940 taxes increased enormously and returns from ore under the premium price plan formula made little allowance for depreciation and depletion.

For example, the allowances for depreciation and depletion of five active lead-zinc producers in Utah during the war period under the premium price plan formula averaged only 11½ percent of the amount allowed by the Bureau of Internal Revenue. The margins given above actual costs of operation were about two-thirds of what the 15 percent depletion allowance would have been. As the costs of doing postponed development work doubled during the war, these mines made no profit from the ores extracted. The margins received to replace this ore by later development work were only half of actual cost. The net result of the premium price plan was that mines suffered damaging losses from which many have not been able to recover.

Unfortunately, the industry became so accustomed to the premium price plan that, following its expiration on June 30, 1947, some form of such a plan colored all the ideas devised and the legislation introduced for extending some aid to mining. These proposed plans and legislation have aroused such bitter dissension that segments of the industry have stalemated each other's efforts. In calmer moments, most mining men would agree that the premium price plan was a thinly disguised cost-plus basis of operation under complete Government control. Whatever justification this system has in war time, it has no place in a peacetime economy. At the same time, the mining industry is in a predicament which only action by Government can greatly remedy.

In the past 20 years of difficult operating conditions the industry has made more improvements in its methods and equipment than in any preceding like period. The capital investment in equipment per man employed has increased more than four times and the precautions taken for safety and health have increased many times this ratio.

Today the mining industry faces the paramount problem of working out a means of extending its productive life. A complex situation arises as present low cost mines become exhausted and the costs of exploring for and developing new reserves skyrocket. Here a mine operator familiar with the factors involved urges that a solution be sought on the proven basis of competitive enterprise.

Foreign Sources Control Metal Prices

Now, costs for labor and materials are pretty largely determined by subsidized industries and those that are enjoying an unprecedented activity and prosperity and are able to pass on added costs to the consumer. Likewise, the prices paid for metals are beyond domestic control and are determined by the much lower costs in foreign countries, aided by depreciated currencies, the lack of normal foreign consumption and the need for dollar exchange.

Most of us have watched the feed to a big gyratory crusher and have wondered what would happen when some rugged individualist of a tough boulder came along. Would it stall the crusher and survive—they never do. Mining today is caught between the jaws of high costs and relatively low prices following a long and exhausting period of operation which has not been profitable.

Two illustrations of cause and effect show the situation of the industry. A short time ago W. C. Page, vice-president and manager of western operations, United States Smelting Refining and Mining Co., collected data from most of the lead-zinc producers in the western states as to their costs and returns in the period 1930-1939 and the last half of 1949. Tabulating this data it appeared, in general, that it had cost twice as much to produce $1.00 worth of combined lead-zinc in the last half of 1949 than it had in the decade 1930-1939. In this tabulation, an average lower grade ore in the later period was a considerable factor.

One other straw to show the effects of such conditions: In Utah in 1939 there were 212 shippers of lead-zinc ores. The U. S. Bureau of Mines' figures show that in the first quarter of 1950 there were only 24 such shippers of these ores—an alarming mortality rate. These examples of the depressed condition of domestic mining could be multiplied many times.

Metals Vital to War Effort

In recent years much has been said and written as to the grave risks we are taking in the event of another world war if we do not have a going and healthy domestic mining industry. In the past two wars domestic mining did provide an important advantage and, by assuring a supply of readily available metals, the industry greatly shortened the duration of those wars.

Another factor is that the United States consumes, on the average, something more than 40 percent of the world total of copper, lead and zinc and about the same percentage of other metals. Together with the large recoveries of secondary metals, we are practically self-sufficient as to lead, slightly short in production of zinc at present prices and at least 35 percent short in balancing domestic production of copper with consumption.

The high per capita consumption

of metals is what determines the standard of living we enjoy, and in the foreseeable future, metals will continue to be as essential to growth and well-being as they have been in the past. It has been suggested that future needs for metals will be cared for by finding substitutes. Undoubtedly, substitutes will be found for certain uses of metals, just as we have in the past; but also, new uses will be found for these same metals. For example we may find that lead is so necessary for insulation against atomic radiation that it will be difficult to get enough of it.

Metal Prices Will Rise

Writing in the ENGINEERING and MINING JOURNAL, March 1950, William P. Shea assumes that the world's population will increase and that the standard of living will improve in the last half of this century in somewhat the same ratio as it has in the first half. If there is no major war, this would certainly be true and if there is a major war, we shall need all the metals we can get anyway. Mr. Shea further assumes that an improving standard of living will require a consumption of copper, lead and zinc per capita in direct proportion to such improvement; in fact, as he points out, in more backward countries the consumption of metals will increase more rapidly than the standard of living because such countries have not the back-log of metals in use on which they can draw.

Mr. Shea concludes that demand for copper, lead and zinc will probably more than double in the next 50 years and, even though we exercise every possible efficiency in producing, reclaiming and using substitutes for metals, nevertheless prices inevitably must rise to levels that may prove to be extremely high compared with present prices.

If the United States is able to maintain its present production for the next 50 years, increasing demand would require that foreign production be tripled in this length of time. Neither of these two requirements can be met except under the stimulus of much higher prices and far more liberal treatment as to taxes. We need not wait 50 years—the trend should become apparent within the next decade. World consumption of copper has already crossed the line of supply at what was considered in the past to be "normal" prices for this metal.

It would be impossible to predict what the American consumer must pay for metals if and when we are producing only one-third of domestic copper consumption and perhaps one-half or less of our lead and zinc. In a natural market the price of a commodity is determined by the economic worth of the increment or decrement of the supply in relation to the demand. Even a slight excess or deficiency of a commodity may change the price considerably; that is, the price curve varies geometrically, or another way of stating it would be that a variation of 10 percent in the supply might cause a price change of 25 percent or more and the price so determined applies to the entire production, not to just the difference between supply and demand.

Domestic metal producers have always been fiercely competitive and the American consumer has enjoyed a natural market. If conditions change and most metals are purchased abroad, the chances are that an artificially controlled market will exist. For years, controlled prices have been paid for diamonds from South Africa. Controlled prices were paid for potash from Germany until domestic resources were developed. This has been true of camphor from Formosa, quinine from the Dutch East Indies and crude rubber from Malaya. Such controlled prices have been brought about at least with the blessing of the governments in which countries the commodities were produced and often times by their active participation in fixing such controls. If metals in the future are going to be in increasingly short supply, the only restraint and protection existing will be our own domestic production.

Exceptional Cost of Metal Imports

The common argument in favor of increasing metal imports to this country is that it decreases the amounts of direct costs for European assistance that the American taxpayer must pay. To a minor degree this is probably true; possibly a small amount of the money paid for imported Mexican lead finds its way back to European countries, but if so it is a mere trickle, an infinitesimal item compared with the losses suffered in closing down domestic mines to make a market for Mexican lead. Then too, this European assistance program is a national policy and as such should be shared somewhat equally among all taxpayers. To pay for this European assistance indirectly as the mining industry is doing, means that domestic mining is paying many times over what the direct costs would be plus the capital losses of shutdowns and rapidly deteriorating mines and plants and the losses of the population dependent upon mining. The only evidence of forethought in this entire policy is contained in the recent proposed revenue bill, H. R. 8920, which provides that losses from abandonment can be written off only against capital gains; in other words, digging the victim's grave before the execution.

A frequently repeated idea regarding the future of the American mining industry is that it would be better to let the ore stay in the ground and mine it at some future time. Possibly such ideas germinate in the minds of agricultural economists from their experience with the benefits of letting crop land lie fallow. It has taken 75 years to build the domestic mining and metallurgical industry to the pre-eminent position it occupies today; ten years of complete shutdown of mines and plants would be equivalent in damages done to abandoning farms, building and livestock for a period of 50 years and suggesting to the farmers that they find jobs elsewhere.

If we are to have a domestic mining industry in the future, it must be independent and competitive and it will then be efficient. It must be a prosperous industry, so prosperous that venture capital will risk new development undertakings, knowing that if they are successful their returns will warrant the chances they take. There is demand in this country for all the metals we can produce so that there is no need to embark upon some new, untried system of premiums, bonuses and government controls to bring about these objectives; it can be done by proper tariffs and a reformed tax system suited to the peculiar conditions of mining.

In the trying times ahead, the duration and seriousness of which none of us can fully anticipate, it should be realized that America has become powerful because of an abundance of resources developed because it was profitable to do so. In this process of developing and producing these raw materials, they have been logically utilized to the utmost, industries have been expanded into ever widening circles and skills and knowledge have been acquired that make it possible for these United States to meet nearly any emergency.

Master of Metals

How the oxy-acetylene flames serves modern mechanized civilization by joining and cutting many different metals and alloys is shown in a new 16-mm film in sound and color entitled "The Oxy-Acetylene Flame-Master of Metals." The film, produced by the Bureau of Mines in cooperation with the International Acetylene Association combines photography and animated drawings to tell the story of oxy-acetylene welding and cutting from the making of calcium carbide out of limestone and coke and the extraction of oxygen from the air, to the uses of the oxy-acetylene flame in twentieth century industry.

Requests for free, short-term loans of the 19-minute film should be sent to the Bureau of Mines, Graphic Services Section, 4800 Forbes St., Pittsburgh 13, Pa. Stamps should accompany the order to prepay parcel post charges of the 5-lb film.

Ingenious Devices Meet Special Problems

Unique Equipment Designed by Coal Company Employes Solve Specific Operating Difficulties

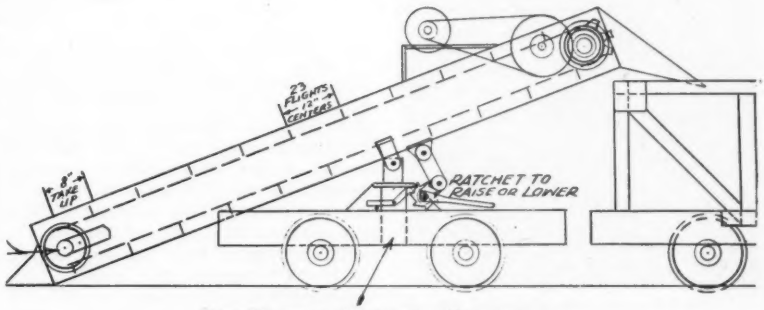
MECHANICAL SUMP CLEANER

Submitted by
H. A. STROHL
Lehigh Navigation Coal Co., Inc.
Lansford, Pa.

TO eliminate the mean and dirty job of cleaning sump by hand this unit was developed. It has proven a success in reducing both costs and manpower normally required for this work. By hand a crew of seven men consisting of motorman, patcher and five laborers would bail out or load five to six cars of semi-fluid muck per shift; with the sump cleaner a force of four men—motorman, patcher and two laborers load an average of ten cars of muck per shift at a cost per car of 35 percent of the hand mucking cost.

With the hand method, buckets of muck were scooped up from the floor of the sump and thrown into a car; with the mechanical sump cleaner the men with long handled shovels guide the muck onto the scoop at the bottom of the cleaner where the flights push the muck to the top of the conveyor and throw it into a car.

The greater part was built from materials on hand with only small outlay of cash for parts, such as gears, V-belts, etc.

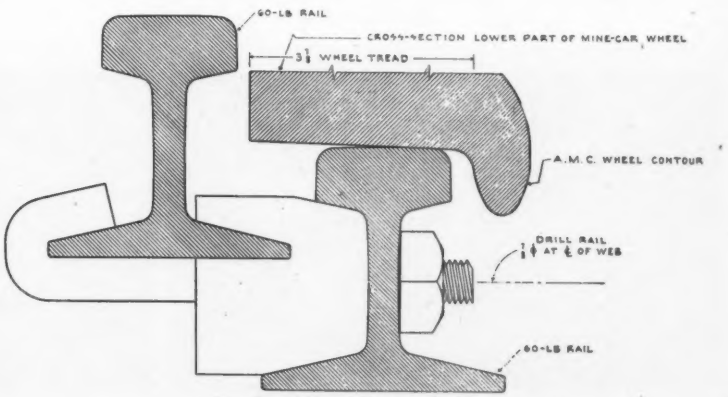


Portable sump cleaner simplifies clean up

GUARD RAIL SUPPORT AND CLAMP

Submitted by
J. B. HESTER
The Union Pacific Coal Co.
Rock Springs, Wyo.

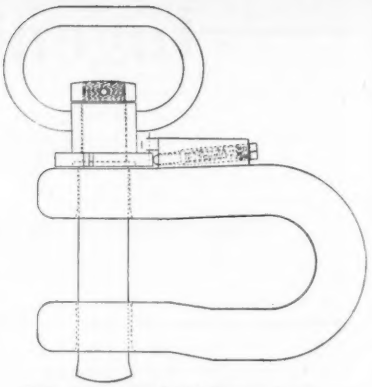
PROPERLY constructed and installed guard rails reduce wear and tear on hoisting ropes and reduce to a minimum hazards and delays due to derailments at turnouts. This type of guard rail support and clamp installation does a good substantial job requiring a minimum amount of upkeep. The clamp is made from two pieces of 60-lb steel; the guard rail being held to the track rail proper by an 8-in. threaded clamp and nut made from ¾-in. bar stock. The clamp is attached to the outer base of the guard rail and supported by a built up chock which supports the inner base.



Guard rail support and clamp

SAFETY CLEVIS AND PIN

Submitted by
J. B. HESTER
The Union Pacific Coal Co.
Rock Springs, Wyo.



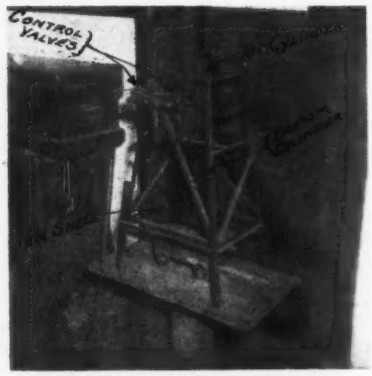
Safety clevis and pin fastens hoist rope to car trips

TO assure safe and rapid rope changes on pitching seams in the Union Pacific Coal Co. mines, the safety clevis and pin is designed to fasten all hoisting ropes to empty and loaded trips. It is used on the link end of the mine car. The predominating feature of this safety device is that the clevis can be detached from the trip under load without any appreciable amount of binding on the pin. When the pin is turned 265 deg. in a clockwise motion, it can be pulled from the lower portion of the clevis and only in this position is the pin allowed to free the link and coupling. A compression spring forcing a key into the slotted collar on the pin prevents the pin from turning due to different sources of vibration.

MINE CAR CLEANER

Submitted by
L. HAGER
Lehigh Navigation Coal Co., Inc.
Lansford, Pa.

THE model was developed to prove the feasibility of cleaning the heels from mine cars. The machine consists of a head frame to which a top cylinder raises and lowers a bottom cylinder supported between guides fastened to the frame. The bottom cylinder opens and closes a clam shell when lowered into a mine car and cleans out the heel in the car.



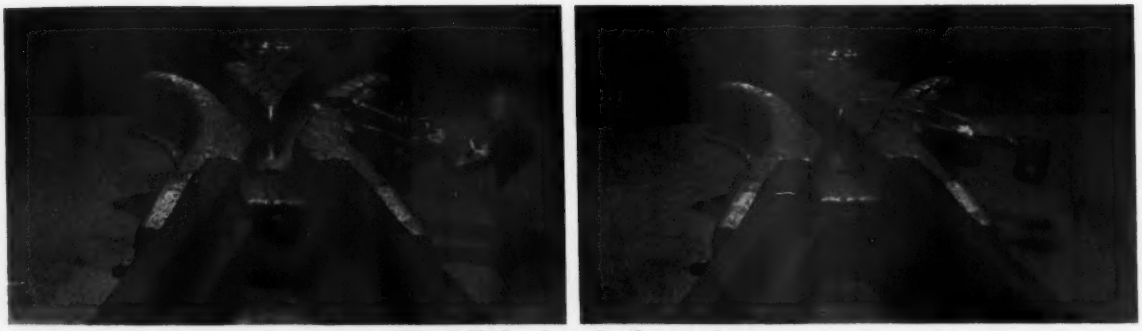
Model demonstrates clamshell car cleaner

The operation is as follows: A car is spotted beneath the cleaner, the operator lowers the bottom cylinder and opens clam shell until the clam shell rests on bottom of car. The shell is closed, picking up the "heel" and then shell and lower cylinder are raised until clear of car. The material in the clam shell is dropped into suitable hopper and conveyed into a car on side track below and to side of track over which cleaner is mounted. The operation is controlled by two three-way valves.

TRACK FROG

Submitted by
JOSEPH BISKO
Westmoreland Coal Co.
Irwin, Pa.

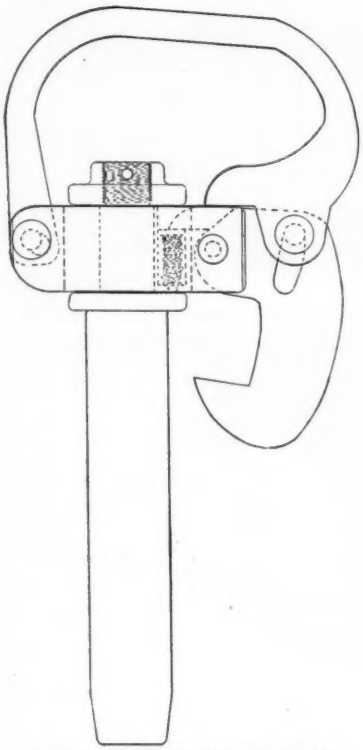
THIS device is for the purpose of eliminating guard rails at track frogs. A metal block, shaped to fit into the track groove is hinged to the side of the frog as shown in the open and closed views. The block is operated by means of a rod attached to the switch throw and acts effectively in preventing derailments at the point of the frog.



Hinged block reduces derailment at frog

SAFETY PIN

Submitted by
J. B. HESTER
The Union Pacific Coal Co.
Rock Springs, Wyo.



Pin features self-closing safety hook

THE safety pin used on the non-link end of the car permits rapid rope changes with a maximum of safety. Its outstanding construction feature consists of a handle and self-closing safety hook. When the pin is being pulled loose from the drawbar coupling by the handle, the safety hook is automatically raised and allowed to free the safety catch. As the pin is replaced through the link end of the rope and drawbar, the irregular curve on the lower end of the safety hook allows the hook to raise automatically and is then forced into proper position by helix springs contained in the swivel of the pin. The springs force the safety hook in a closed position and it cannot be opened until the pin is pulled by the handle.

HOIST SIGNAL SYSTEM

Submitted by
HARRY JOHNSON*
Westmoreland Coal Co.
Irwin, Pa.

THIS system consists of a pair of lights at the top landing, bottom landing and the hoist indicator at the hoist engine. When the top man is ready for the cage to leave, a switch is thrown which puts the No. 1 or top light on at all three places. When the bottom man is ready, his switch is thrown and the No. 2 or bottom light goes on at the three locations. The hoist engineer does not start hoisting until he gets both lights. Midway in the shaft, the lights go out automatically. When the cage lands, the cycle is repeated by throwing the light switches in the opposite directions. Hoisting delays can be determined by the hoist engineer at either landing by the absence of a light. Likewise, both top and bottom men can tell when either of them are responsible for slowing the hoisting cable.

Another feature in connection with this system is a cut-out switch at the bottom landing. In the event a car is not properly caged and the hoist signal has been given, the bottom man can pull this switch, which cuts the power from the hoist engine, thus averting damage to the shaft bottom. It also serves as a safety device while making repairs, cleaning sump, and loading men for hoisting.

*Deceased, formerly chief electrician.

Signal light cuts hoisting delays and serves to improve safety

SAFETY LAMP TESTER

Submitted by
H. A. STROHL
Lehigh Navigation Coal Co., Inc.
Lansford, Pa.

A WELL-CONSTRUCTED wood box serves as the tester. It has a circular hole in the base, a window in the front, a lid to clamp a paper gasket on the top and an air pump to break off the tip of a gas tube and diffuse gas in the body over and around the safety lamp. There is also a side rack for storage of gas tubes as shown by Sketch A and B.

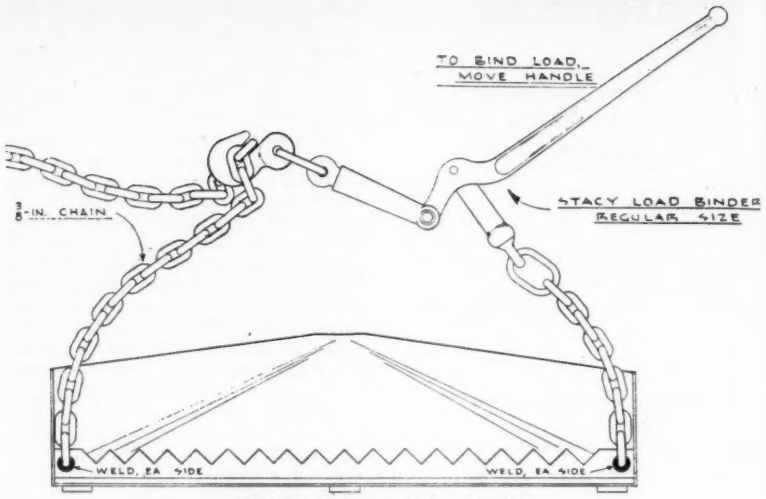
In operation the safety lamp to be tested is placed inside the tester over the hole in the base, the clamp is placed firmly on top of the lamp and the paper gasket is clamped by the lid. Then the lamp is lit through hole in base of tester; the gas tube, which has been placed in the hole in rear of the machine has the tip broken off by the air pump which also diffuses the gas through the interior of the tester. If lamp is defective an explosion occurs which bursts the paper gasket below the lid of the tester.

The device is effective in testing flame safety lamps which may have become non-permissible through defective gauges, gaskets, etc., or poor assembly of parts.

Miniature explosion in tester detects faulty equipment

TIMBER SLED

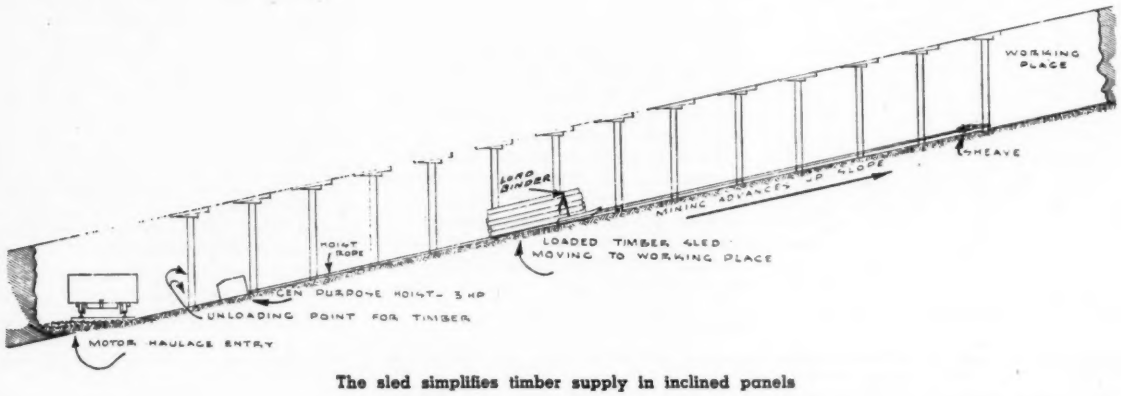
Submitted by
J. B. HESTER
The Union Pacific Coal Co.
Rock Springs, Wyo.



Load binder holds timbers on sled

IN order to supply working faces without disrupting the cycle of operations, the timber sled, pulled by a general purpose 3 hp hoist, is used on all pitching seams in the Union Pacific Coal Co. mines. It will carry a dozen 6-in. diam posts of any length and a large number of cap pieces and wedges, and is also convenient to pull shaking conveyor pans to the advancing face.

The sled is made of ⅛-in. plate, 2 ft 6 in. wide, 3 ft 6 in. long, V-shaped in front, and opened in the back, having a side about 6 in. high. A 1 by 1 in. saw-tooth bar is welded to the bottom of the sled to eliminate the timber from sliding. A ⅜-in. chain and a Stacy load binder or "boomer" welded onto the sides of the sleds, securely fastens the load. A small chain fastened to the front end of the sled is used to attach the rope from the general purpose hoist. The V-shaped front end of the sled is so designed that it may pass over machine cuts or pass by standing posts without difficulty.

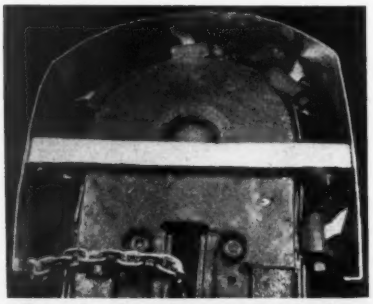


The sled simplifies timber supply in inclined panels

SAFETY GUARD FOR FRONT END OF CUTTING MACHINE

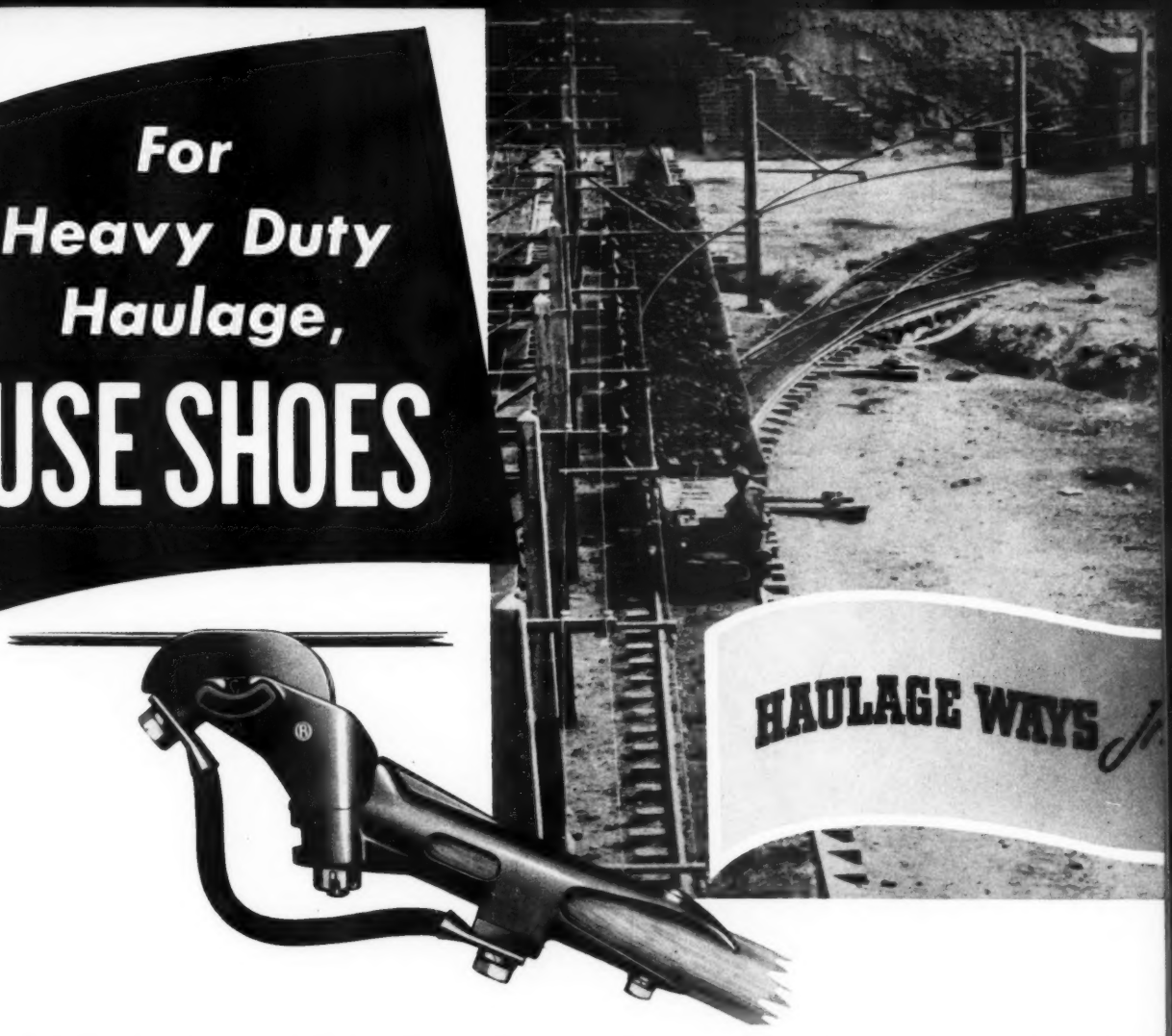
Submitted by
A. G. DEIBLER
Westmoreland Coal Co., Irwin, Pa.

THIS guard is designed to prevent accidents caused by contact with exposed bits when the machine is in transit. The guard is of ⅛-in. sheet steel fitted and shaped to conform to the style of cutter bar. It is provided with a ½-in. chain that serves a dual purpose. One end is attached to the guard while the other end is passed through the cutter bar and over the chain, thus holding the guard in place and providing a positive safety lock for the chain in the event the clutch becomes engaged while tramming. The guard is simple in design, rugged of construction and fulfills all requirements of the mining law.



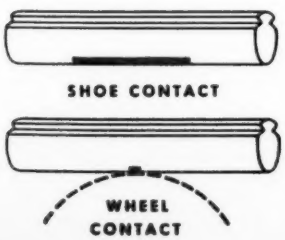
Cutter bar hazards are reduced when guard is in place

For Heavy Duty Haulage, USE SHOES



● If you want a smooth, dependable flow of power from the trolley wire to the collectors of your main haulage locomotives, use a collector that presents the largest possible area to the wire. That's why shoes — O-B Type-L Trolley Shoes — are better suited to heavy duty haulage than trolley wheels. Here's the reason: Shoes, in the first place, do present a larger surface for current transfer than the wheels. Because of this, current passing from the wire to a trolley shoe passes through what might be called a "line" contact, as contrasted to the "point" contact between the wire and a wheel. An abrupt jog in the wire will break the contact between a wheel and the wire, interrupting the power flow. When this happens, there is a good deal of arcing, for the flow of current has been concentrated through a very small area. However, the current flow is distributed through a series of points in the case of the shoe, and since the shoe is less likely to break contact with the wire, the chances for power interruption and arcing are much less. You see, the pivotal center of the shoe is located in the center line of the wearing surface, eliminating any tendency for the shoe to tilt because of friction between the shoe and the wire. Further, a jog in the wire, while depressing the leading end of the shoe, will press the trailing end more firmly against the wire. The reverse is true when the center of the shoe passes the jog.

Your O-B representative will be glad to tell you more about the advantages of shoe current collection. Ask him what it can do for you in your mines.



Field tests show that under identical conditions of heavy electrical load, trolley shoes outlast wheels many, many times. This is because of reduced arcing and burning with the use of shoes. The sketches show the difference in surface covered by the wheel or shoe in contact with the wire.

Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

For positive COUPLER INTERLOCK AT SHARP GRADE BREAKS

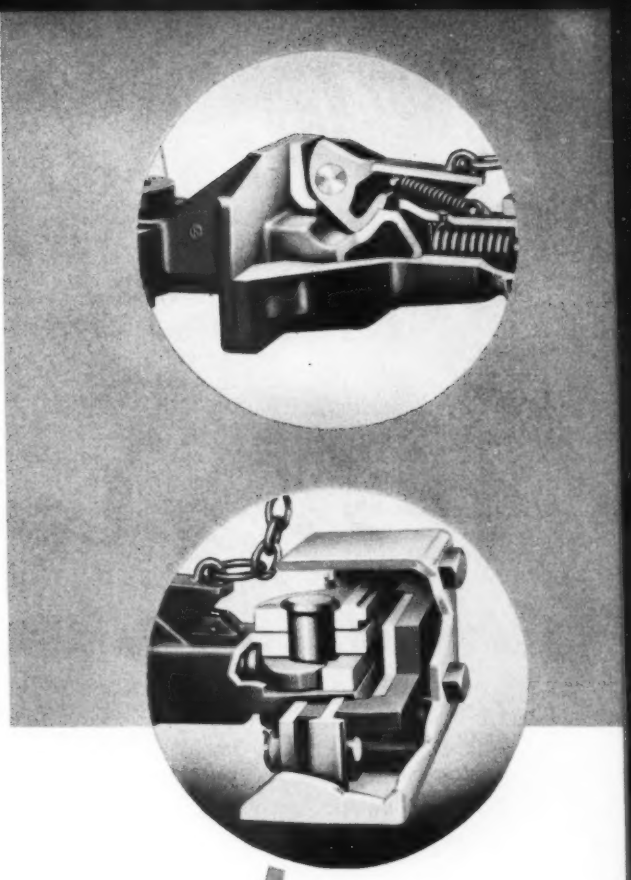
O-B Couplers permit cars to ride the track on this dip without binding at the coupler faces.

Close-up of two mine cars on a 40 foot radius knuckle. Only with considerable flexibility in draft gear mountings can more than one car successfully negotiate such curves.

O-B Automatic Couplers have two features that assure positive coupler interlock even at drastic dips and knuckles. Snug fit between the male and female heads is maintained by a specially designed cam, mounted on the female head, which drops into a notch in the male head. Tension between the two heads increases the tendency of the cam to seat itself in the notch, and to prevent lateral or vertical movement between the coupler faces.

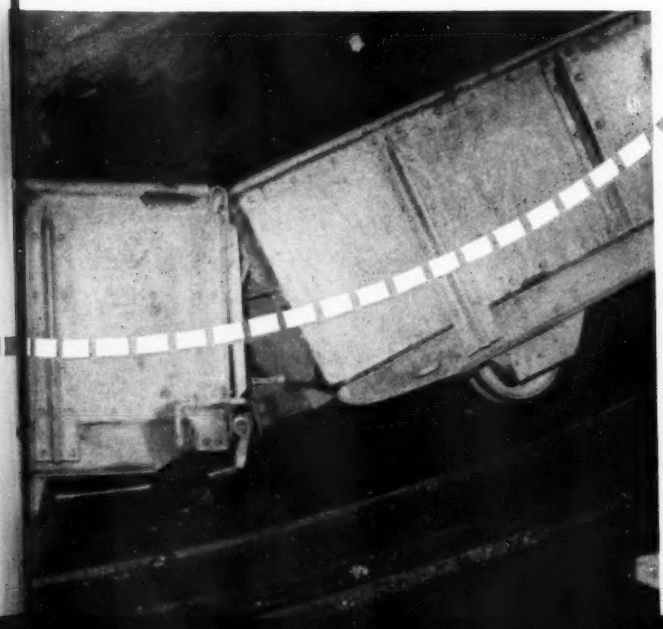
The other feature is the flexible draft gear mounting which permits fourteen degrees of vertical swing for the coupler heads. This flexibility permits trips to move over dips and knuckles of rather short radii; on one property, O-B Couplers easily negotiate vertical curves with radii as short as 40 feet.

Under adverse grade and curve conditions, you need the operational flexibility which O-B Automatic Couplers provide. Write for details as to how they can be adapted to your haulage system.



In the upper illustration, a section of the female coupler head is removed to show the cam in position in the notched portion of the male coupler head.

Below it, a similar cut-away view shows the rubber draft gear, which is flexible enough to permit 14° of vertical swing for the coupler head.



Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

Simple gage

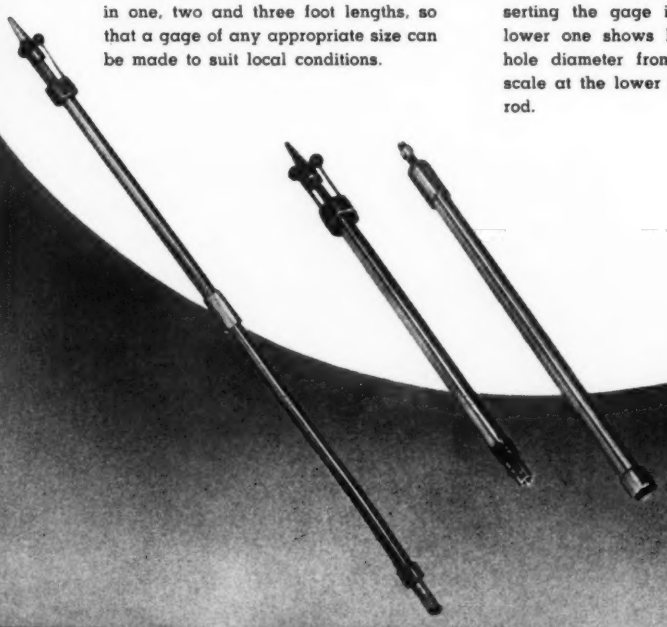
checks bolt hole diameters

Diameters of roof bolt holes are easily measured at any point within the hole with this simple, accurate hole gage. With it, bolting crews can make occasional checks to make certain that changed roof conditions, bit wear, or improper drilling habits are not causing a variation from the allowable range for hole size. The gage is calibrated to read hole diameters in 1/16-inch increments within a range of 1-4/16 to 1-10/16 inches. The allowable range for O-B Roof Support Expansion Shell and Plug installation is indicated on the scale from which diameters are read.

Help your bolting crews save time, and to do a good bolting job at the same time, by equipping them with O-B Roof Bolt Hole Gages.

The length of the basic hole gage is 30 inches. Calibrated extensions are made in one, two and three foot lengths, so that a gage of any appropriate size can be made to suit local conditions.

The gage is easily used. In the top illustration, the operator is shown inserting the gage in the hole; the lower one shows him reading the hole diameter from the calibrated scale at the lower end of the gage rod.



4050M

Ohio Brass

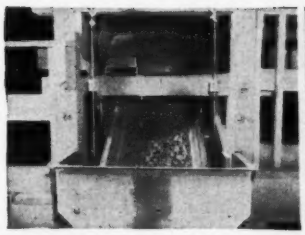
MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

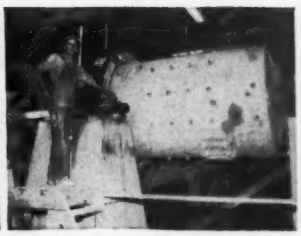
FLOTATION FOR SELECTIVE... RESULTS

ARIZONA BARITE CO. USES... DENVER FLOTATION EQUIPMENT

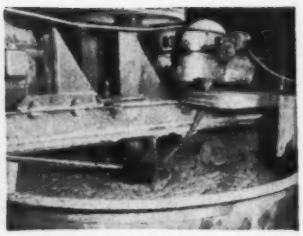
Following test work by U S. Bureau of Mines, Arizona Bureau of Mines and Deco Ore Testing Division, a selective flotation circuit was added to the Arizona Barite operation to meet market specifications for Barite used by the oil industry.



SCREENING: Note the absence of fines on this 4'x6' Denver-Dillon Vibrating Screen. Such efficient screening is produced by the "circle throw" motion of the screen.



GRINDING: Up to 200 tons per day of 75% $BaSO_4$ is handled per day in this 5'x8' Denver Steel-Head Ball Mill. Ball and liner consumption is low.



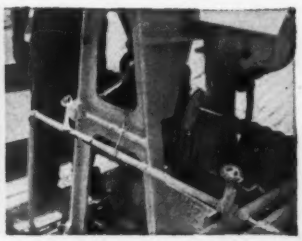
CONDITIONING: Classifier overflow is conditioned in a 5'x5' Denver Super Agitator. Flow of feed directly to agitation zone gives maximum reagent contact with pulp particles.

●

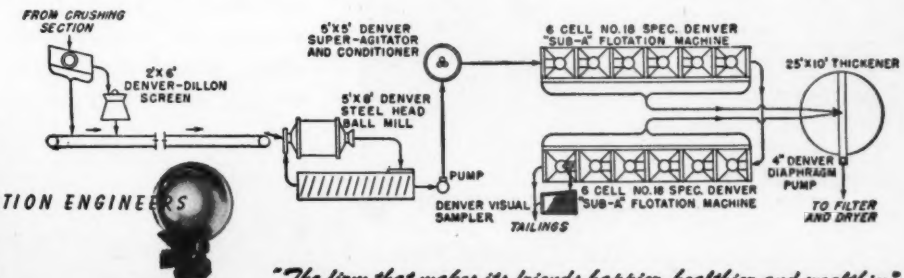
Complete Arizona Barite Company operating story appears in July-August 1950 Deco Trefoil. Write, wire or 'phone today for detailed information on Deco ore testing and equipment service.

FLOTATION: Average feed per day is 125 tons of 75% $BaSO_4$. Grade of Barite is raised to 90% $BaSO_4$ in two 6-cell Denver "Sub-A" Flotation Machines operated in series.

FLEXIBILITY: Each of the 12 Denver "Sub-A" cells produce a finished high grade concentrate. Note uniform bubble structure. Flexibility permits cleaning and recleaning if ore changes.



PUMPING: A 4" Simplex Denver Adjustable Stroke Diaphragm Pump meters the flow of thickened pulp. Adjustable feature (while pump operates) permits critical Barite control.


FROM CRUSHING SECTION
2'X 6' DENVER-DILLON SCREEN
5'X5' DENVER SUPER-AGITATOR AND CONDITIONER
5'X8' DENVER STEEL HEAD BALL MILL
PUMP
DENVER VISUAL SAMPLER
TAILINGS
6 CELL NO.18 SPEC. DENVER "SUB-A" FLOTATION MACHINE
6 CELL NO.18 SPEC. DENVER "SUB-A" FLOTATION MACHINE
25'X10' THICKENER
4" DENVER DIAPHRAGM PUMP
TO FILTER AND DRYER

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

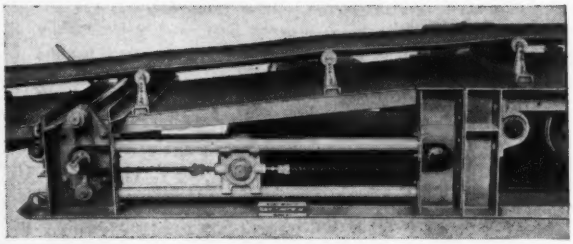
FLOTATION ENGINEERS

"The firm that makes its friends happier, healthier and wealthier"

DENVER • NEW YORK • CHICAGO • EL PASO • VANCOUVER • TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG • RICHMOND

DENVER EQUIPMENT COMPANY, 1406 17th St., Denver 17, Colorado

WHATEVER YOU NEED GET IT "OFF-THE-SHELF"

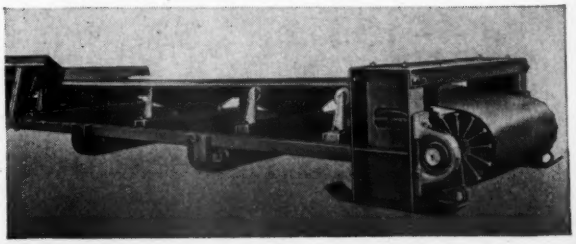


INTERNAL TAKEUP

Located directly back of the drive. Handles 10′ of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Double-acting pawl prevents backing-up. Worked from either side of conveyor.

TAIL SECTION

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings *and belt*. Strong enough so you can rest a feeder on it.



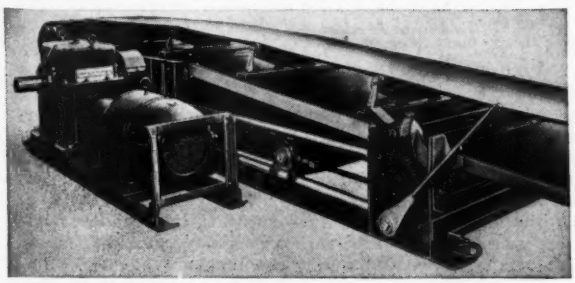
IN A MINE CONVEYOR— AT HEWITT-ROBINS!

Shipped Complete—Right Out of Stock— from Passaic, N. J., and Charleston, W. Va.

Every mine is different—every mine has different underground conveying problems. That's why Hewitt-Robins makes not one but *three* different types of mine conveyors. That means mine operators can match Hewitt-Robins equipment against their own *specific requirements* and get exactly what they need, right out of Hewitt-Robins warehouses in Passaic and Charleston. Not just the conveyor machinery itself, but belt, motors, reducers and drives!

Hewitt-Robins *Types I* and *IS Mine Conveyors* have *internal* drive for level, *up*hill or *down*hill operation; in 26", 30", 36" widths, lengths up to 3000 feet or more if needed. *Type H* has head drive for level or *up*hill operation; in 26" and 30" widths, lengths up to 2000 feet.

Intermediate Sections are standard, fit all types, simple to assemble because both ends are identical and need no "matching up." Available in 8′ and 10′ lengths. Also available are standard 12′ Intermediate Sections—channel construction, bolted connections—for permanent 30", 36" and 42" wide main haulage installations. using the standard terminals.

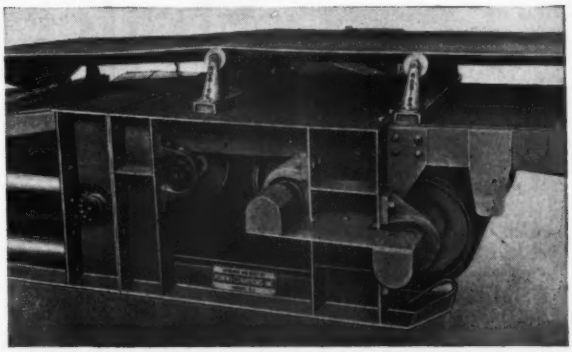


UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base—skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.

You can choose single or tandem pulley drive, internal or tail takeup, the length and belt width that fits your particular mine . . . but in every case you get famed Ajax® heavy-duty belting, Hewitt-Robins ball-bearing, one-shot lubrication idlers, lagged pulleys for maximum power transmission . . . over half a century of engineering and manufacturing know-how!

Remember—*only Hewitt-Robins* makes both machinery and belt; *only Hewitt-Robins* is willing and able to take unified responsibility for successful installation and operation! For complete specifications—or out-of-stock delivery—write Hewitt-Robins Incorporated, 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic, N. J.



SINGLE OR TANDEM DRIVE

Hewitt-Robins Mine Conveyors come equipped with *both* single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

HEWITT-ROBINS
MINE CONVEYORS

HEWITT-ROBINS INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

Cars from the undersea mines ascend sloping trestle and are dumped at tipple where the ore is crushed

Northern Iron Ore Meets Strategic Needs—Part II

Mechanization of Bell Island Plant and Equipment Will Increase Production

By JOHN E. KELLY
Consulting Engineer
Parkersburg, W. Va.

CANADA'S first large iron ore producer with a present annual capacity of 1,750,000 long tons is Dominion Steel & Coal Co., Ltd. Newfoundland's undersea mines tap one of the greatest known deposits, estimates of which run up to five billion tons of recoverable high-grade ore. Three workable seams or beds outcropping on Bell Island in Conception Bay have been intensively studied by geologists, among them Dr. A. O. Hayes of Princeton University, whose report is a classic of painstaking deduction applied in the field of mineral economies.

The iron beds, deposited in Ordovician time when Newfoundland lay in a tropic sea, covers ten miles of the bottom of Conception Bay, to Cape Saint Francis. The origin of the iron is in doubt; it seems unlikely that it was derived from the erosion of the Labrador deposits 700 miles to the westward, yet the latter have been gouged by ice and water until the present reserves, great as they are, represent but a fraction of the original deposition. Beds of iron ore, gravelly or cemented, occur along the northern shore of the St. Lawrence estuary and the Hamilton River, both of which lead generally from the Labrador iron fields toward Newfoundland.

During the Ordovician age the floor of Conception Bay was raised and lowered several times and, according to the findings of Dr. Hayes, the currents and temperature of the water changed on such occasions. Borne by tidal streams entering the bay, the iron ore was laid down as sand in shallow warm water, in which grew reeds and other marine forms. Such growths were the habitat of shellfish whose fossils date the deposit. Among other life was a species of burrowing worm, which penetrated the iron sand by gorging and disgorging it, causing a chemical change therein. Casts of these worms are characteristic in microscope slides of Conception ore.

In a geologic cataclysm, the bay floor sank and the iron sand was covered by silt and mud. The bottom was upheaved again and the iron-bearing currents took over, depositing another layer. This process was repeated on numerous occasions, the mud and iron sand turned to rock under pressure. The economic result has been the deposition of three mineable beds of high grade iron ore. The Upper Bed, lying closest to the bay floor, is from 6-13 ft in workable thickness, with a rock layer of 200 ft minimum between the ore and the ocean above. Fifty-eight feet of rock separate the Upper from the Middle Bed, equally thick. The Lower Bed, 10-30 ft in thickness, where most of the mining has been done, lies 240 ft below the Middle seam. The rock layers make mining possible, for they hold out the sea. The uppermost rock cover thickens with distance from the shore, until at the working faces now over two miles from dry land, miners in the Lower Bed work 1600 ft below sealevel, with a cover of 1300 ft to the Bay floor. Nonetheless, the crash of storm waves and occasional grounding of icebergs can be heard in the mines.

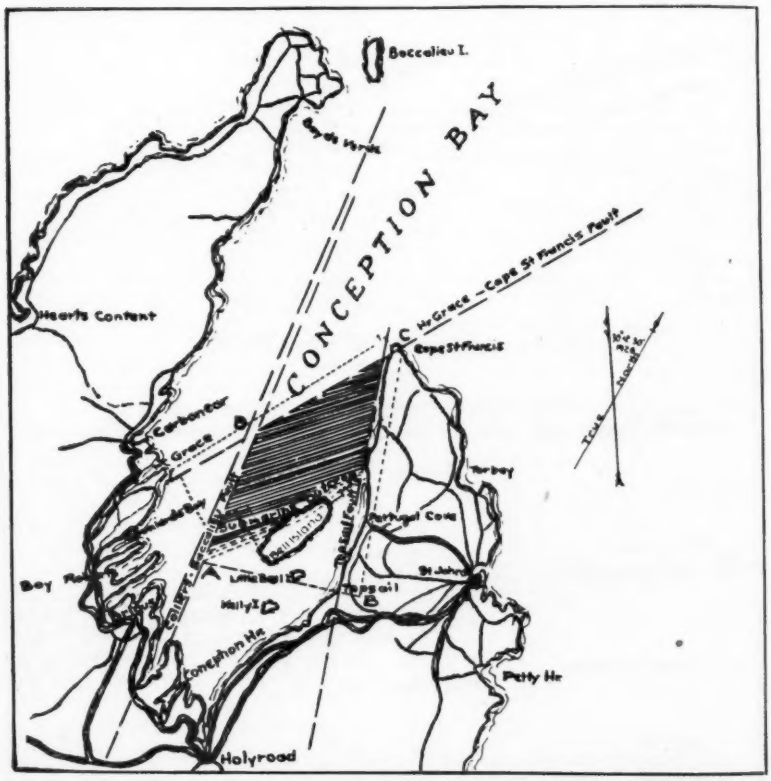
Reserves Lay Under Water

Following the deposition of the iron ore and rock layers, the region was subjected to stress, resulting in several major faults which define the area. (See map herewith.) A trapezoidal block, abutting on the north side of Bell Island, is bounded by the Topsail Fault to the east, the Harbour Grace-Cape Saint Francis Fault on the north, while westward operations apparently will be limited by the Colliers-Baccalieu downthrust. These faults enclose an area of about 150 sq miles. Dominion Coal & Steel Co., Ltd., through subsidiaries, holds 132 sq miles, 109.5 in fee simple. A 99-year lease from the Crown covers the balance. The Dominion holdings extend beyond the known fault zones on all sides (dotted lines on the map herewith), except to the west, where a smaller undeveloped area is leased by the Coghlan-LeRiche group of Montreal.

Bell Island, six miles by two in extent, lies in the southern (upper) end of Conception Bay, itself a narrow slot in the northeast shore of Newfoundland. Access to the island, save by ocean-going ore carrier, is by highway from the Provincial capital of St. John's 17 miles to Portugal Cove, whence a ferry with capacity for four automobiles and about 100 pedestrians makes the 3½-mile transit to Bell Island. Power and telephone cables also cross the bay. Some 9000 persons live on the flat top of the island, nearly all of whom depend for their livelihood on Dominion's operations. Two thousand men are employed continuously by the company, an additional 250 during the April to January ore-shipping season. After a pay raise in 1949, miners' hourly wages approximate 94¢. The company provides certain additional facilities, such as medical care, insurance, and lower than prevailing retail prices for foodstuffs and dry goods in commissaries.

Part I told the story of the vitally important new reserves found in Ungava by joint Hollinger-Hanna activity. Here is up-to-date information on the undersea deposits of Bell Island, Newfoundland, where the application of modern methods will boost output of the high grade Wabana ore.

The eastern, southern and western shores of Bell Island are precipitous, rising sheer as much as 250 ft. There is a small break in the cliffs at the southeast, where the ferry lands; another on the west at Lance Cove, suitable for use in developing the Coghlan leasehold. The long north side of the island, facing the mouth of the bay, dips toward the sea at an inclination of eight degrees. The iron ore beds outcrop on the island, where mining was started in 1893. Two years later the first shipment was made, to Philadelphia. A major incentive to development of the mines was construction of blast furnaces at Trenton, Nova Scotia, and later at Sydney (440 miles distant) by the Dominion interests. Coal for this steel operation is mined in the immediate vicinity of Sydney, limestone 100 miles away at Port au Port, N. S. Fluorspar, also used in the reduction, comes from St. Lawrence on Newfoundland's southern shore.



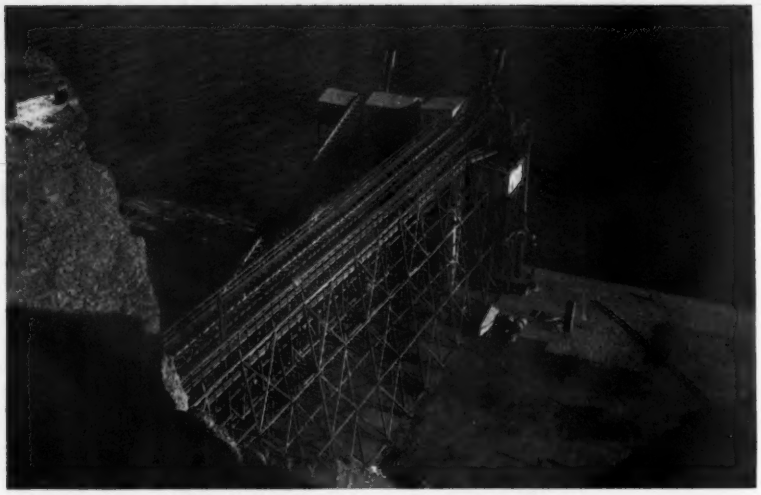
Conception Bay. Potential ore bearing zone shown cross-hatched comprising 70 sq mi and area held by corporation, 132 sq mi, indicated by dotted lines

Room and Pillar System Used

Originally the outcrops were worked by open pits until increasing overburden forced adoption of the "room and pillar" method, common in coal mining. This permitted removal of 75 percent of the ore, as far as the shoreline. Thereafter, since a minimum roof thickness of 200 ft was required to prevent collapse which would flood the mines and lose the ore permanently, a belt along the shore was left unmined. From the point where the ceiling was 200 ft thick until increasing depth of the overlying rock reached 800 ft, tests proved it safe to remove 60 percent of the ore, leaving the balance as pillars. Further under the bay, with a rock overburden exceeding 1000 ft, the great weight caused a reduction to 50 percent of the ore in place and this percentage is presently taken. No settling has been noted. Wabana (Indian for "place where daylight first appears," a name selected by the discoverer, of no geologic or historical significance) ore has a laboratory crushing strength of 19,600 psi in 2-in. cubes. Despite the apparently hazardous nature of this submarine mining, the factor of safety exceeds 6. at 50 percent extraction.

Four Slopes Handle Mine Output

The mines are worked by four inclined shafts or "slopes," with portals on shore. (See map.) Mines Nos. 2 and 4, with a daily capacity of 1000 tons each, tap the Lower Bed. Their working faces have progressed to a point about one mile offshore. Between them, the shaft of Mine No. 3 leads 12,000 ft under the bay. This is the largest of Dominion's operations, producing 1700 tons daily, also from the Lower Bed. Mine No. 6, also rated at 1700 tons per day, serves the



Piers load a 10,000-ton ore carrier in two hours

Upper and Middle seams, now 1.25 miles north of the island. The average production of 2.7 tons per man-day is lower than in comparable American mines and a cause of Dominion's modernization program.

Although the average dip of the formations in place is eight degrees northward, numerous minor faults crossing the bed "step down" the level of the beds like rude stairs. For this reason "slopes" are driven at an angle of 14 percent, to intersect the beds at depth, replacing former bores which followed the ore. Despite the faulting, so great is the pressure of the rock ceiling that no sea water enters the mines. Fresh water, following the strata from the inland, is encountered in fault zones only. Pumps lift less than 500,000 gallons of seepage water daily, from 12-33 percent of their capacity. The wettest mine is No. 3, the lowest and furthest out, which pumps 500 gpm for 7½ hours per day.

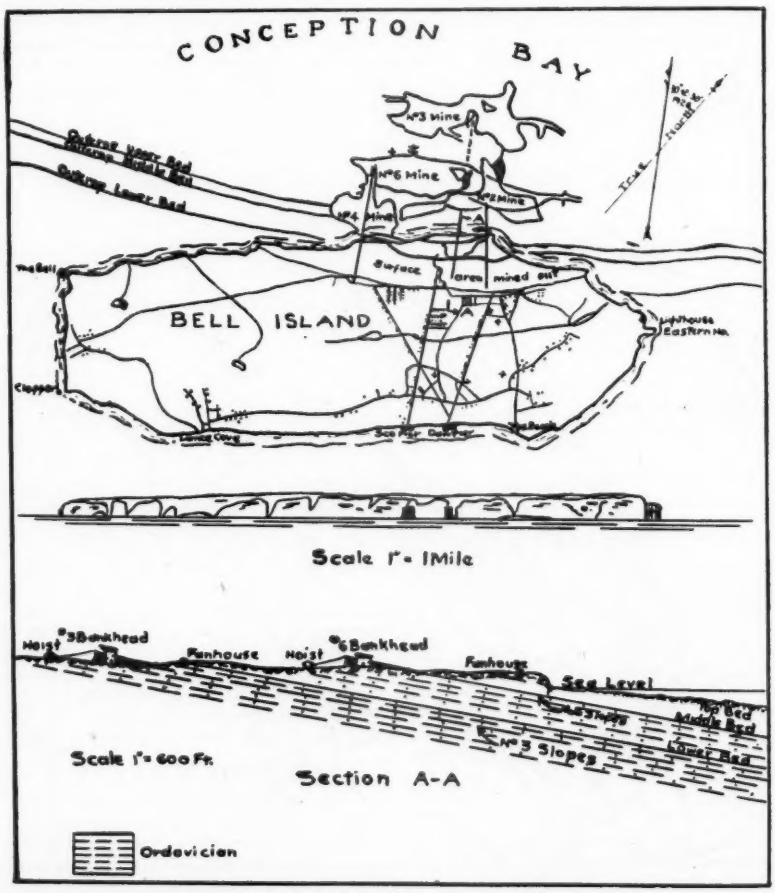
Production for the period 1946-48 averaged 1,411,000 tons per annum. In 1948 shipments totaled 1,721,000 gross tons. The mines have produced over 46,000,000 tons to date and "ore in sight" is sufficient for 25 years' operation at the rate of 2,250,000 tons annually, production expected upon completion of pending improvements. Beyond this known ore lie a probable billion tons in reserve.

Wabana ore is of high grade, the iron content running from 50.5 to 58.5 percent. It was a prime favorite with German steel makers prior to World War II, who purchased the Bell Island output at the rate of 1,000,000 tons annually. It is liked for its clean cubical cleavage, scarcity of fines, and structural strength which makes it stand up well in the blast furnace. The relatively high phosphorous content is offset by blending with other ores by themselves structurally unsuitable for ideal furnace charge. It is said that at the Sydney steel plant the high sulphur Nova Scotia coal "neutralizes" the phosphorous to a sufficient extent, a statement not confirmed elsewhere.

Brought to the surface, Wabana ore is dumped in elevated bankheads or tipples, waste rock removed, crushed and hauled at the rate of 10,000 tons daily to the two loading piers on the south side of the island. In the winter period of January to April, the ore is stockpiled. The loading piers are served by eight miles of three double-tracked tram lines, of 24-in. gauge, drawing small cars on endless cables. Despite the inefficiency of the device and lack of adequate loading facilities (two conveyors only for each ship, requiring shifting of the vessel to fill four cargo hatches), each pier accommodates a ship of 30-ft draft. Vessels of 10,000 gross tons capacity are loaded in three hours' time or less from storage bins cut in the overhanging cliffs, holding 20,000 and 65,000 tons, respectively.

The Bell Island mines are now wholly operated by electric power. Annual consumption averages 20,000,000 kwh. The "juice" comes from mainland hydro-electric stations of the Newfoundland Light & Power Co., 35 miles distant. A three-phase, 30,000-v transmission line gives way at the bay shore to twin three-core steel armored cables. Power is delivered to the bus bars of Dominion's Bell Island steam plant at 6600 v.

(*Continued on page* 55)

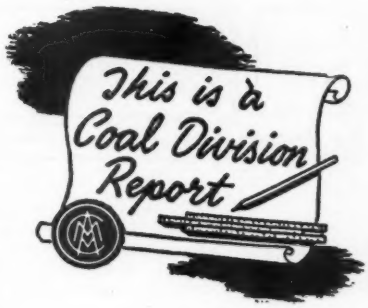


Bell Island showing location of mines and surface plants

Ventilation for Continuous Mining

Practices Used at Eight Operations Vary to Meet Local Conditions

By Coal Division Committee
on Mine Ventilation



OPERATIONS described here are located in the Appalachian field over a wide area from Northern Pennsylvania to Southern West Virginia. The seams range in height from 3½ ft to as much as 7 ft and the character of the coal differs. Recognizing that physical conditions, such as gas, roof, moisture, and the amount of coal dust formed, all have some bearing on the ventilating method, the committee will not attempt at this time to set up any standards or recommended practices. The immediate purpose will be to study methods and techniques used in actual operations, confining the study to the ventilation of the working faces and areas immediately adjacent. The report will not deal with the main ventilation system of the mine or how air is brought to the continuous mining panel.

The eight individual accounts submitted as a part of this report give fairly complete details, including the mining plan, direction of air currents, amount of air, etc., as well as the physical conditions encountered. Since continuous mining is a new development, none of these operations have a long record of experience but all have progressed far enough to have determined ventilating requirements. A study of their methods brings out a number of interesting factors which are summarized as follows:

Summary

Mines covered in this study are all engaged in entry development—driving three entries or, in the case of Mine A, three sets of double entries. In addition, Mine B is driving rooms. The width of the places varies, but all are comparatively narrow. The general plan is to drive one entry for a relatively short distance—about one breakthrough length, then change over and advance the other two the same distance.

In all three mines the continuous operation is on a separate air split. The current is directed across the working faces by line brattices; permanent stoppings are used between the intake and return entries with doors and checks in all instances kept to a minimum. It will be noted that Mine E states that all canvas doors and checks have been eliminated from the haulage road by making the middle entry an intake and splitting the air to the right and left at the top breakthroughs. (See Fig. 4) Special attention is called to the air lock in the haulage way in Mine A (See Fig. 2); this was found necessary to conduct an adequate return of air to the first working place and permits the passage of car trips without breaking the air circuit.

In most cases, line brattice are used to take the air from the last breakthrough up to the working face. Mines A and F bring fresh air in behind the curtain and return it over the machine; all of the others reverse this direction and bring fresh air over the machine, returning it behind the brattice. This latter method is used to increase visibility at the working faces as well as to safeguard against possible methane and dust hazards at the machine and a typical plan is shown in Fig. 1. The amount of air passing over the machine varies from 6000 to 15,000 cfm in the different operations.

All have from three to five water sprays at several points on the machine but at different pressures, varying from 135 to 550 psi. Mine A uses M. I. compound; the others spray untreated water. The amount of water is not given except for Mine B that uses 5.5-6.5 gpm, and Mine D from 7-11 gpm, but it should be noted that Mine D has additional sprays installed behind the brattices to take out any dust that may have passed through the machine sprays.

The rate of methane emission varies. In Mine A, methane was detected by a flame safety lamp on only two occasions; in this highly gaseous mine the emission of gas from exposed coal surfaces is constant but is more uniform and in lower volume than under conventional mining methods. This is undoubtedly due to an absence of shattered face and ribs that would normally liberate methane.

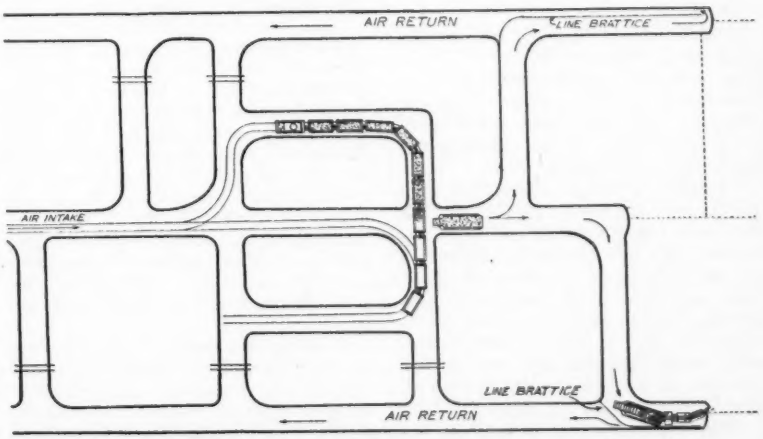


Fig. 1. Typical method of ventilating continuous mining working faces

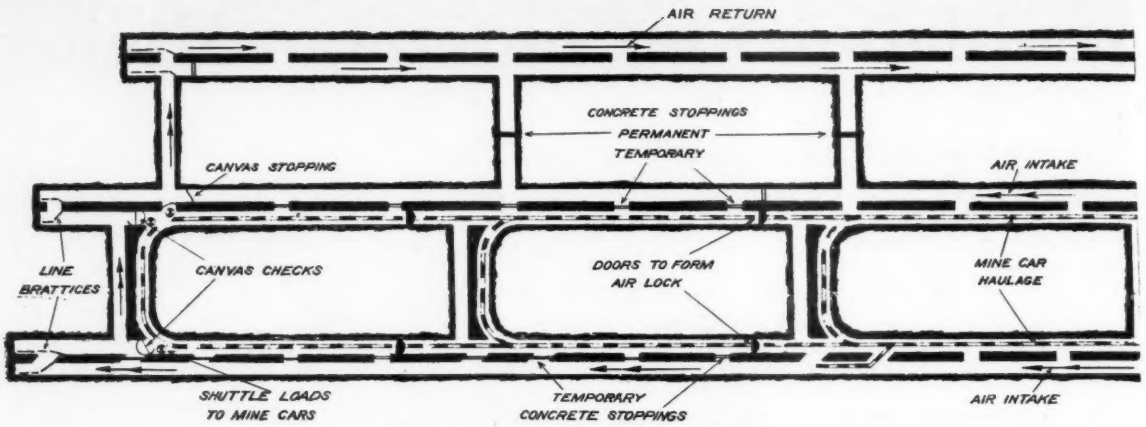


Fig. 2. Plan of entry development at Mine A

Even with exposure of a gas feeder the rate of emission is slower than in conventional mining. It is mentioned here that the lineal feet advance per shift of approximately 50 ft is equivalent to no greater area of exposure than occurs in many of the usual present day mechanical set-ups. In other words, a mechanical loading unit driving six entries in a panel and making an 8-ft cut in each one during the shift, would expose as much face and rib as a continuous mining advance of 500 ft in a single entry.

In contrast with this situation, the entry development in Mine D has been abandoned in areas that liberated gas at a rapid rate from the coal faces. One actual experience showed a continual elongation on the safety lamp and at times a mixture of 1.6 percent, by the detector. This was in an entry driving at the rate of 65 ft for a seven-hour shift, and being ventilated with from 12,000-15,000 cfm of air.

The following accounts give details of the mining plans and methods of ventilating the working faces.

Mine A—Pittsburgh Seam

Figure 2 shows a plan of mining in the Pittsburgh seam of coal having a mineable thickness of 6.5 to 7.0 ft. The projected development was accomplished in 264 shifts, and considerable difficulty was encountered from clay veins. Lineal advance per shift averaged roughly 50 ft.

Initially, canvas facilities were used totally inby the active loading station, but were found unsatisfactory due to considerable loss of air. The plan with an air lock outby the loading point and concrete block stoppings, as shown in the figure, is now used; 6000 cfm of air can be readily circulated through the last open breakthrough in any of the three sets of double headings.

Only on two occasions, since the machine has been put into operation, was methane detected on a flame safety lamp at the face. The emission of gas from the exposed coal surfaces is constant, but more uniform and in lower volume than under conventional mining methods. This is undoubtedly due to absence of shattered face and ribs which would normally liberate methane. Even with exposure of a gas feeder, the rate of emission is slower than in conventional mining. It is noteworthy here that the already mentioned lineal foot shift advance is equivalent to no greater area of exposure than occurs in many of the usual present day mechanical setups.

As can be seen on the projection, the line brattice is located on the intake side of the air split. A velocity of 300 fpm is obtainable behind the canvas, and this has sufficed to dilute the methane. However, it should be explained that these entries are driven parallel to a large mined out area—about 400 ft away—and this mining has naturally bled off a considerable quantity of methane from the coal measures. This seam where the machine is working is extremely gaseous and normally a considerable quantity of air would be required in the development of virgin areas.

Handling of coal dust by air current has not proven satisfactory. Spillage from the unit was appreciable and greater portion of it was fine mesh which had to be loaded by hand before rock dust could be applied. This condition was considerably improved by discharging coal from the machine directly to the floor, which became a storage bin, and loading it from the floor into shuttle cars by a mechanical loader. It was necessary also, however, to thoroughly "wet down" the coal before discharging it from the boom.

Sprays for allaying the dust were changed from their original locations to those where most effective job could be accomplished. The nozzles are operated at 135 psi, with water piped through M.I. compound pellet type self-mixing chambers. The area is kept heavily rock dusted at all times.

Mine B—Kittanning Seam

This report is based on an actual operation started the middle of December 1949. The mine is working in the lower Kittanning seam; the coal at this location has an average thickness of 46 in. The mine is classed as gassy by the Pennsylvania Department of Mines, but the liberation of methane is in such small concentrations that it has not been a problem up to the present time.

The continuous machine, which is at present on development, started to work in an auxiliary aircourse which was being driven between two sets of room entries. This place was on the return or right side of the ventilating current. With this arrangement, the air was conducted to the face with a line brattice, using a canvas check at the last open crosscut. The air, conducted behind line brattice on the left side, swept the face and returned back over the operator; this greatly impaired his visibility. This arrangement is also undesirable because any dust in the atmosphere is also carried over the shuttle cars and power cables.

After completing this connection, the ventilating current was then made to travel from right to left, bringing the air to the face with line brattice arranged so that the intake is on the low velocity or wide side of the canvas. The intake air, passing over both shuttle cars and machine operator, sweeps the face and returns behind the canvas. Due to the large quantity of air that seems to be necessary for this type of mining, the line brattice was nailed to guardboards at the top and bottom to keep it from blowing against the ribs and air escaping through the last open crosscut.

Line brattice and canvas checks should be arranged, whenever possible, so that the shuttle cars do not have to pass through them. When and where checks are necessary, a measure

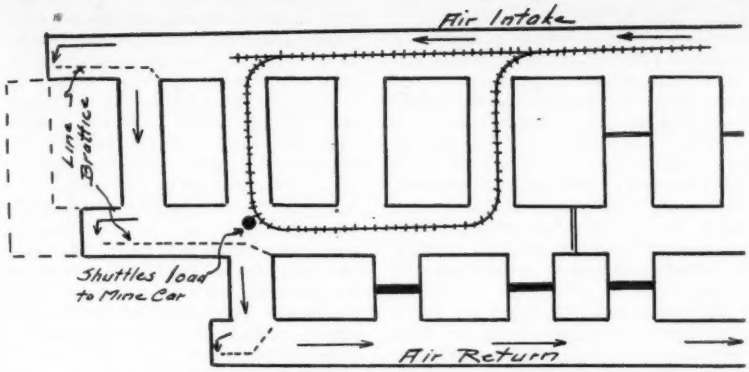


Fig. 3. Method of ventilating working faces at Mine C

of success has been attained with checks made from 30-in. belt. This is made by cutting the belt in strips equal to the height clearance; these strips of belt are then suspended from a crossbar or other suitable support on small hinges, or regular belt splice fasteners, so they will swing in either direction. A piece of double canvas is placed in the check at the position where the operator passes through.

The split method of ventilation is used exclusively in this mine. There are no doors in use. There was 46,500 cfm entering the section, which was divided into three splits with 16,800 cfm entering the panel, where the continuous miner is working. The air at the face crosscut in this panel was traveling at a velocity of 210 fpm in a 64-ft area, making a total quantity of 13,440 cfm at the face crosscut.

At present the machine is equipped with three high-pressure sprays for allaying dust. Water is supplied from a 2-in. bore hole. The static pressure at the pump is 200 psi which is boosted to 400 psi for use at the machine. The total capacity of the three sprays is about 5.5 to 6.5 gpm.

Even with this method of allaying dust and taking the air to the face on the operator's side, there is still something to be desired toward increasing visibility and respiratory conditions. At the present time the company is considering an experiment with a wetting agent and different types of spray nozzles.

Roof bolts, as far as has been observed, do not have any appreciable effect on the ventilation, probably because the State of Pennsylvania requires that the conventional plan of timbering be used in conjunction with roof bolts. The opinion is held, however, that roof bolts, properly installed, will be a great aid in maintaining aircourses, especially in the low coal fields.

Mine C—Eagle Seam

The seam mined is the Eagle with a height of 43 to 52 in., and a middle band 4-6 in., located 8-10 in. from bottom. Overlaying the coal is a 4-16 in. drawslate and soft shale—extending in some portions to a hard brittle shale.

Present development of three entries is shown in Fig. 3. They were driven to expand present mains and to keep from cleaning up old entries. The present three entries are to be increased to four, and panels are to be developed by driving the headings to this barrier pillar and bringing rooms back each side.

Two shifts are worked. Each shift works in two places—driving 25-30 ft—pulling out and driving the second place 25-30 ft. Thus the advance will be from 50-60 ft per shift; this is to keep from stopping the machine to timber. When the machine leaves the first place to go to the second, the first place is timbered by roof bolts and posts. The two right entries are the haulageways and after they have advanced the required distance, the track is extended while the machine is driving the left entry.

In conventional mining roof bolts are used on 3½-ft centers. Previous to the use of roof bolts, 3 by 8-in. by 14-ft headers were installed on 2½-3-ft centers.

The miner is equipped with three sprays, two No. 3 and one No. 4. This does a fair job of allaying dust at the face and does not wet the coal to the extent of causing a major cleaning problem. Line brattices are used to insure a good current of air at the working face at all times. The first plan was to put the brattices up in conventional manner, i.e., intake on tight side, but it was found that dust was being taken back over the machine. As the size of sprays could not be increased to allay the dust without creating a preparation problem, the intake was changed to the wide side and the return on the tight side with fair success. Faces are cool and dust free and it is planned to use additional sprays on the return to help allay the dust.

Mine D—Eagle Seam

This operation has from 10,000-15,000 cfm carried up the haulage side of the working place, over the equipment, and out behind the canvas, which is kept within 5-7 ft of the face. Working places are driven as near 15 ft wide as possible and posts for the canvas are set 3.5-4 ft from the rib. It is necessary to have that much area behind the curtain to carry off the volume of air being coursed into these places, and also necessary to have from 11-12 ft of width for shuttle car haulage.

This system of carrying air up the working place is opposite to what the mining industry has always been taught, but has been approved by State and Federal Inspectors. The old way of taking the air up behind the canvas and returning it out the roadway would be impractical and impossible. The system in use, as long as the volume is maintained, carries off the coal dust that is not knocked down by the water sprays, so the

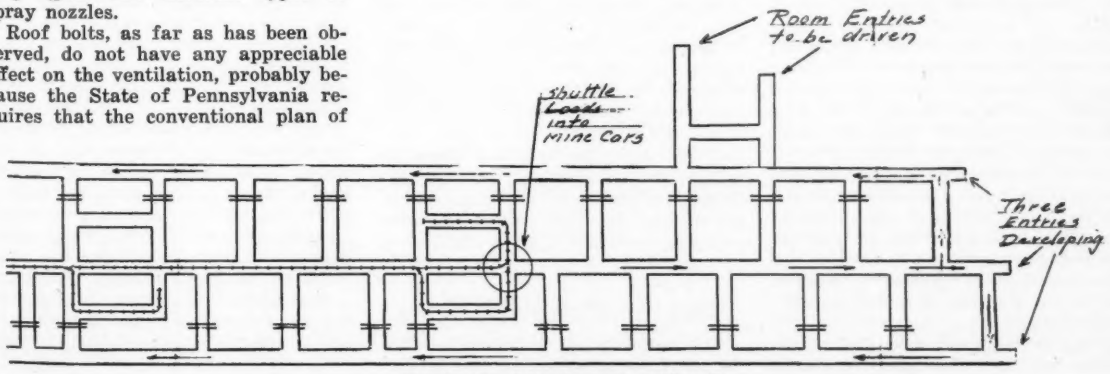


Fig. 4. Panel development at Mine E

operator's visibility is such that he can handle his machine efficiently at all times.

For dust abatement it is necessary to apply considerable water by vapor sprays. At present, several experiments are being made with different numbers of sprays, sizes, and water pressures, but most machines operate with five sprays applying approximately 7-11 gpm. Under the present market conditions it looks as if 7 gpm is about all that can be added to the coal unless there are special drying facilities in the cleaning plant.

The line curtain must be watched carefully and placed in such a way at the face so as not to allow whirlpools of air to form and throw the dust back in the operator's face. This is a matter of experimenting and allowing enough area for the air to flow freely around and out behind the canvas.

Dust raised at the junction of the two conveyors on the machine is serious if allowed to get away from the

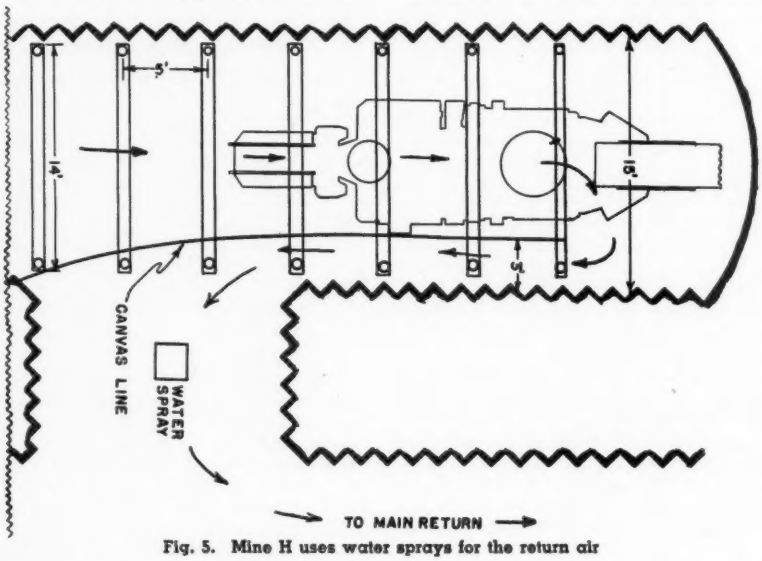


Fig. 5. Mine H uses water sprays for the return air

sprays located on the sides of the junction hopper. It will bother both the operator and the shuttle car drivers. This is also a matter of experiment.

At present three sprays are used, two small and one large one. They are covering the coal on the conveyors like a blanket. Pressures are from 200-550 psi. Experiments show that most any pressure between 200-400 psi will do a fairly good job of allaying the dust. However, inherent moistures and drying facilities at the preparation plant will determine to a great extent the pressures to be used in the mine because the pressures will influence the volume of water applied on the coal.

Entry development with continuous miners has been abandoned in seams liberating explosive gases at a rapid rate. This means where the gas is coming directly from the exposed coal face and not from the top, bottom, or falls. One actual experience showed a continual elongation on the safety lamp and, at times, a mixture of 1.6 percent by the detector. This was in an entry driving at the rate of 65 ft for seven-hour shift and being ventilated with from 12,000 to 15,000 cfm of air. No new development work will be attempted in such conditions under the present system of ventilation and haulage.

Both room and entry work are being ventilated with 10,000 to 15,000 cfm. Any less than that is not conducive to health, safety and good preparation. A lesser quantity of air would mean that additional water must be added to knock the dust down which the air had failed to carry away. This would mean preparation trouble at the tipple.

It has been found that plastic brattice cloth is more efficient and will carry more air to the face than the present conventional type of woven cloth.

Additional sprays are installed behind the curtains to knock down the dust which has escaped at the face. When the returns are inspected, it is noted that there is little dust being dropped by the air current nor is there any illegal amount of coal dust in the air current.

Roof bolting has been mentioned as a means of aiding ventilation for continuous mining. So far there is no advantage on roof bolting because stopping to roof bolt stops continuous mining.

Mine E—Pittsburgh Seam

The mine shown in Fig. 4 operates one continuous miner in the Pittsburgh coal seam. The height of coal is 6 ft with about one foot of overlying drawslate; entries are driven 14 ft wide. Liberated methane is diluted in compliance with the mining law and to the extent that the return air readings show methane percentages that vary from 0.05 to 0.10. The ventilation practice is to conduct the air to the face with line brattices.

Water for sprinkling purposes is piped throughout the mine with a pressure better than 150 psi at the most extended places. Sprinkler outlets are mounted on both sides of the continuous miner forming a flat sheet spray that envelops the head of the machine, allaying the dust in this manner.

The average rate of development is about 35 ft per shift and rock dusting is done mechanically. The rock dust is applied during the work shift, whenever there is a delay in loading operations and in compliance with the mining law. Although law requirements are that with sprinkling, while mining the coal, rock dust must be kept up to not more than 80 ft from the face, generally dusting is begun when the dust is 40 ft or less from the face.

All canvas doors and checks have been eliminated from the haulage roads by taking the entire 15,000 cfm input up the haulage entry and splitting the air right and left at the last open breakthroughs on each side. This provides a means of taking the intake over the top of the machine and returning it behind the line brattice. It also carries back in the air current any dust still remaining in suspension which was not allayed by the sprays. Because of the high velocity behind the curtain the remaining coal dust in suspension is carried back a considerable distance from the face. The present system is to keep the line brattice to within 6-8 ft of the face. Not more than the last two breakthroughs are left open, one on the right side and one on the left side. Permanent stoppings are erected in all others outby.

Mine F—Pittsburgh Seam

At this operation one continuous miner works in two parallel headings with breakthroughs on 60-deg angles. Line brattice is hung 4 ft from rib on roof bolts, forcing the air up to the back or discharge end of the miner. The biggest objection to this velocity at the face was the agitation of the dust and its blowing outby to the operator, but changing the sprays on the cutter head so as to produce a heavy fog instead of mist, does a better job of knocking down the dust. Headings are 14-15 ft wide in approximately 60-in. coal, and after the first 40 or 50 ft of the advance is driven, a line brattice and curtain is put in the heading at the last open break. At the start of this operation, a place was driven from breakthrough to breakthrough without any attempt to

force the air to the machine or face. Even though the mine has no methane to handle it was found that this method was not satisfactory.

Mine G—Pittsburgh Seam

This operation drives three parallel headings with breakthroughs on 60-deg angle. In trying to drive from breakthrough to breakthrough without any control of the air from the last cross cut, it was impossible to remove the dust. Consequently the machine had to be stopped periodically. There is a small amount of methane to handle so the following method of ventilating the face is being tried; two small blowers are installed; one setting in last open breakthrough, blowing through 12-in. vent tube; and one blower at the machine, blowing through tubing out past the discharge end of the machine. This no doubt results in a certain amount of air recirculation.

Mine H—Pittsburgh Seam

This is in the Pittsburgh seam of coal in the Fairmont area. Six feet of the coal is mined, leaving approximately one to 1.5 ft of head coal. The room is driven 15 ft wide, and 4-in. by 6-in. by 14-ft wooden crossbars are set on 5-ft centers. Crossbars are supported by steel jacks. The room is projected to drive 250 ft to leave the finished working face approximately 360 ft from the loading point and the ventilation intake to the working room.

The ventilating current comes in over the shuttle loading point at the entry, into the room, over the continuous miner, and goes out behind the canvas brattice line. The brattice line is anchored to wooden cross bars 3 ft from the coal rib, thus making an area of 18 sq ft behind the brattice. Regulations call for a minimum of 6000 cfm in the last open crosscut. Crossbars are kept to within approximately 10 ft of the working face and the brattice line terminates on the last crossbar. No methane was detected by a flame safety lamp at any time during the shift. Crosscuts are driven from the working room to adjacent rooms approximately every 60 ft. On the intake at the loading point 20,000-25,000 cfm is maintained. (Fig. 5)

Four water sprays were operating from the head of the continuous miner, and one spray is set up in the last open crosscut where the ventilating current returns from the working face.

Committee on Mine Ventilation:

STEPHEN KRICKOVIC,
Chairman

L. D. ELLISON
A. J. FRAZIER
RUSSELL HERBY
L. F. KERNS
J. S. LAIRD
J. J. SNURE.

Northern Iron Ore

(*Continued from page* 50)

New equipment is replacing machinery long in use during the modernization program directed by W. E. Stuewe, mine manager. Mr. Stuewe was borrowed from Anaconda Copper Mining Co. to modernize the Dominion company coal mines. His outstanding performance led to the present assignment, which is planned to double daily capacity and increase worker productivity, at a cost of over $5,000,000.

Ore is brought from the mines along the inclined ways or slopes by cars operating in tandem on double tracks. In No. 2 Mine, a 550 hp Vulcan hoist handles two trains of six cars each. The maximum train load is 20 tons, the hoisting cable 1.125 in. diam steel wire. Some 40 miles of wire rope, ranging from 1⅝-⅜ in., are in use. Replacements average 36 miles per year. Mine rails weigh from 18-100 lb; company tracks total 59 miles.

Hoisting and carriage equipment at No. 4 is similar to that in No. 2. The hoisting speed is 1800 fpm over a distance of 1.25 miles with a grade against load of 14 percent. No. 3 mine, equipped with a 1500 hp Wellman electric hoist with double drums 11 ft in diameter, brings ore up a 12,000-ft slope at 2800 fpm. A 1⅝-in. cable secures the two 20-ton steel cars, operating on balanced load. No. 6 mine hoists six 4-ton cars per trip with an 850 hp Vulcan hoist. Mines Nos. 3 and 6 possess steel frame bank-heads and pulley towers, the others as yet use wood with timber incline approaches. Except in No. 6 mine, which employs a rotary tipple, permitting dumping a train as a unit, mine cars are unshackled in the bank-heads and dumped manually. Gates crushers reduce lump ore to minus 5 in. in bank-heads at Nos. 2, 3 and 4 mines. No. 6 has a No. 30 McCulley installation.

Each day some 2200 miners take the 12,000 ft ride to the working faces

Underground and undersea, about ninety Ingersoll-Rand DA-35 and Gardner-Denver 89Bs are used in drilling, employing 50,000 ft of 1.25-in. Rand hollow drill steel. Rooms are driven 25 ft wide, headways 18 ft. The day and night shifts divide this chore. After the day crew has completed drilling the rounds, the second shift loads and blasts.

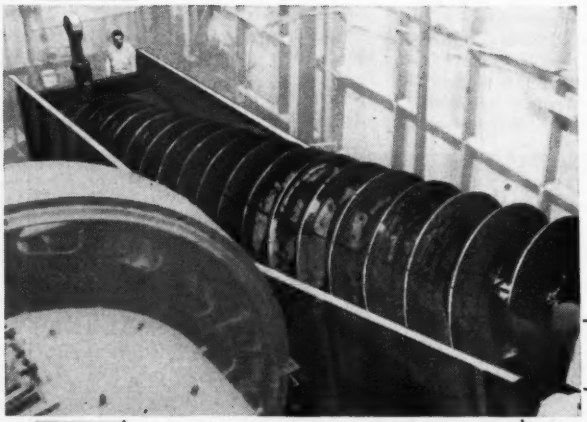
In No. 2 mine, and at No. 4 save for one drag scraper, operation is by hand loaders. Nos. 3 and 6 mines have mechanical loaders for most of their output. Drag scrapers work in No. 6: five Thew shovels of 230 tons daily capacity each, serve No. 3 mine. Drag scrapers in use include nine 60-hp Ottumwas in the 2- or 3-drum types and two 50-hp I-R three-drum. Six electric locomotives (four 13-ton Goodman and two five-ton G-E) serve as prime movers for mines Nos. 3 and 6.

Partial replacement of Mesabi by Atlantic Basin ores will affect the pattern of American steel production, accelerating the decentralization of an industry heretofore largely grouped in the Pittsburgh-Youngstown-Cleveland triangle. Canadian or South American ores, economically waterborne, make possible the erection of the New England steel mill, as well as that proposed for a site on the Delaware River. The old steelmaking maxim: "Bring the iron to the coal" is being discarded in favor of mills located near their customers, and increasingly the markets move toward the Atlantic, Gulf and Pacific coasts. Dependence upon overseas ore involves the risk of wartime interruption, but Ungava hematite, linked to American steel mills by rail, could play Mesabi's role in future hostilities, assuring full production of the sinews of war, steel.

Actual Operating Results Prove Efficiency of **WEMCO S-H CLASSIFIER**

Sharp separation at large capacity is a proven result at the Fredericktown Mill of National Lead Company, St. Louis Smelting and Refining Division. In handling a lead-copper sulfide ore, a WEMCO S-H Classifier is more than meeting requirements for close separation (desired grind — 60% minus 200 mesh).

SHARP SEPARATION — From the table below note that this WEMCO S-H Classifier overflow analyzed 64.0% minus 200 mesh, showing a recovery of 88.1% of the minus 200 mesh material contained in the feed. Despite the high percentage of plus 65 mesh fraction in the classifier feed, only 4.5% was retained in the overflow. The sands, analyzing only 5.4% minus 200 mesh, contained 95.5% of the plus 65 mesh feed.



LARGE CAPACITY — Rate of overflow in this installation is 825 tons per 24 hours, exceptional capacity for a unit of this size (72" x 32' 0", Series 125, Straight Tank, Triple Pitch).

SCREEN ANALYSIS

WEMCO S-H Classifier at Fredericktown Mill, National Lead Company, St. Louis Smelting and Refining Division.

	INDIVIDUAL PERCENTAGES RETAINED ON			CUMULATIVE DISTRIBUTION OF FEED SIZES	
MESH	FEED	SAND (61.4% OF FEED)	OVERFLOW (38.6% OF FEED)	SAND	OVERFLOW
+65	51.2%	79.8%	6.0%	95.5%	4.5%
100	9.8%	8.9%	11.2%	89.2%	10.8%
150	5.8%	3.9%	8.9%	85.0%	15.0%
200	5.0%	2.0%	9.9%	80.7%	19.3%
-200	28.2%	5.4%	64.0%	11.9%	88.1%

THE S-H DESIGN

- **Greater capacity** of WEMCO S-H Classifiers is proven in operation — and explained by design. The S-H design permits use of a triple spiral for greater raking capacity with decreased pool agitation. In turn the greater capacity for sand removal creates a larger effective settling area. Both sand and overflow capacity equal that of the next larger size machine of other makes.
- **Modern design** of the WEMCO S-H Classifier gives superior operating results. The main shaft has a diameter up to 40% greater than other spiral classifiers. Flight arms are shorter and stronger, bearings are antifriction and fully protected, and modern hydraulic lifting action is provided for the spiral. Because the design is right, WEMCO S-H Classifiers do more work yet cost you less to run.

Write today for full descriptive literature.

PRINCIPAL OFFICES
San Francisco • Sacramento • Salt Lake City • Spokane
Pocatello, Idaho • Denver • Phoenix • Tucson • Chicago
Hibbing, Minnesota • Bartow, Florida • New York

EXPORT DISTRIBUTORS
The Ore and Chemical Co.
80 Broad Street • New York 4, N.Y

Continental Europe and North Africa
Dr. Ing. Herbert Lickfett, A/B, Stockholm 3, Sweden
S. E. M. U. Paris, France
Ferdinand Egeberg & Company, Oslo, Norway
Midec, Milan, Italy
A. Schubarth & Company, Basle, Switzerland
G. Maltisiniotis & Co., Athens, Greece
Agence Miniere & Maritime, S. A., Antwerp, Belgium
Adil Gobay & Albert Koenka, Istanbul, Turkey

Fraser & Chalmers (S. A.) Ltd., Johannesburg, South Africa
Lilestone & Co., Inc., Manila, Philippines

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET SAN FRANCISCO 7, CALIFORNIA

WKE (HMS) Mobil-Mill • Coal Spiral • Standard Thickeners (HMS) Thickeners • (HMS) Media Pumps • Hydroseparators (HMS) Densifiers • (HMS) Separatory Cones • "SH" Classifiers Sand Pumps • Conditioners and Agitators • Fagergren Flotation Machines • Dewatering Spirals • (HMS) Laboratory Units

Wheels of GOVERNMENT

AMC

As Viewed by A. W. DICKINSON of the American Mining Congress

ADJOURNMENT of Congress, until after the November elections at least, looms as the Senate speeds the Revenue Bill to conference and the Maybank-Spence economic controls measure awaits final White House action. Congress, the Administration and the country as a whole appear to be taking the national emergency and the difficult international situation in their stride and it is even possible that the Congress may not return until January.

Taxation

On September 1 the Senate passed and sent to conference its version of the Revenue Bill of 1950. The Senate measure would up corporate income tax rates on 1950 income to a 23 percent "normal" tax on all income and a 19 percent "surtax" on any income over $25,000. For 1951 and subsequent years, the "normal" rate would be 25 percent with a 20 percent "surtax" on income in excess of $25,000—making a combined tax rate of 45 percent beginning January 1, 1951. Individual income tax rates would be raised to the "tentative levels" adopted in 1945, and still shown on tax returns, by repealing the percentage reductions voted in 1945 and in 1948. These increases would become effective October 1, at which time the withholding rate would be raised from 15 percent to 18 percent.

Certified defense plants would be permitted to amortize capital costs over a five-year period. A one-year carry-back and a five-year carry-forward of net operating losses is provided. The bill includes the "Mills Plan" which calls for a speed-up on payment of corporation taxes. The holding period for long term capital gains or losses remains at six months, as in current law.

Of particular interest to mining is the action of the Finance Committee in striking out the House-approved provision under which losses on abandonment or sale of capital assets or of property used in the trade or business would be deductible only against capital gains. Another extremely important action was the rejection of Section 204 of the House bill, under which transportation of ores or minerals to the mill or treatment plant would be disallowed in determining gross income from the property for computing percentage depletion. In place of this the Senate adopted the amendment urged by the American Mining Congress, under which transportation to the plant where the ordinary treatment processes are performed is, like the processes themselves, to be considered as a part of the mining operation. A further constructive action by the Committee was the rejection of a provision in the House bill to tax dividends paid out of earnings or profits accumulated before March 1, 1913, or appreciation in value accrued prior to that date.

The Senate eliminated provisions which would have extended percentage depletion to many new minerals, and struck out the provision in the House bill increasing the depletion allowance for coal from 5 to 10 percent.

Renegotiation

An eleventh hour attempt by the National Security Resources Board to rush a "Renegotiation Act of 1950" through the Congress is probably doomed to failure. The measure specifically includes raw materials, exempt from renegotiation under World War II Acts and under current law.

Spokesmen for natural resource industries testified before the Committee on Ways and Means on August 11 and 14, urging that the bill be amended to exempt contracts and subcontracts for raw materials. S. H. Williston, vice-president, Cordero Mining Co.; M. D. Harbaugh, vice-president, Lake Superior Iron Ore Association; Robert E. Lee Hall, general counsel, National Coal Association; and Vincent P. Ahearn, executive secretary, National Sand and Gravel Association, declared it is of the highest importance that the exemption of mineral raw materials included in previous renegotiation statutes be included in the pending bill if the producers of mineral raw materials are not to be unduly hampered in their vital contribution to national defense.

AMC Secretary Julian D. Conover likewise protested the omission from the pending bill of the exemption from renegotiation of contracts or sub-contracts for the product of a mine which had not been "processed, refined or treated beyond the first form or state suitable for industrial use." He pointed out that as early as September 1942, the then Undersecretary of War, Robert Patterson, had stated that the problem of administering renegotiation of contracts and sub-contracts for raw materials would be extremely difficult, if not impossible, and had urged the exclusion of raw materials from the operation of the renegotiation statute.

Social Security

The Social Security liberalization bill, H. R. 6000, was signed by the President August 28, following House and Senate acceptance of the con-

★★★★★★★★★★★★

Washington Highlights

CONGRESS: Poised for home flight.

TAX: Bill in conference.

RENEGOTIATION: Dropped for this session.

SOCIAL SECURITY: Bill signed.

CONTROLS: Awaiting White House approval.

STOCKPILING: Appropriation doubled.

MANPOWER: Senate hearings in fall.

FUELS: Appropriation for study reduced.

★★★★★★★★★★★★

ferees' report. The controversy over the Knowland (Rep., Calif.) amendment, which would prevent the Secretary of Labor from withholding unemployment compensation funds from a State until the highest State court rules as to whether or not State actions conform to Federal law, was a hot issue in the House. The final vote of approval, however, was 374 to 1. The Administration vigorously opposed the Knowland amendment but Senate Finance Committee Chairman George stated that if there was a White House veto, any proposed expansion of the Social Security program would be "dead" so far as the present Congress is concerned.

The bill as approved by the President retains the common law status of mine leasers and independent contractors in the mining industry, a provision which was vigorously urged by representatives of the American Mining Congress in testimony before the Finance Committee.

Economic Controls

The President is momentarily expected to sign the Defense Production Act of 1950 in the form finally approved by both the Senate and the House on September 1. This law will give the President broad powers to regulate the national economy, establish priorities, require performance of defense contracts and allocate material and facilities. The White House may encourage voluntary action by business, agriculture, labor and consumers to bring about wage and price stabilization, but the President may also establish individual or general price ceilings and at the same time he is required to stabilize wages. Power is further given to establish effective procedures for settlement of labor disputes; to impose consumer credit controls; and to exempt from prohibition of the anti-trust laws, actions taken under voluntary programs at the request of the President.

The Act provides for expiration of the provisions governing priorities, allocations, requisitioning and expansion of production capacity on June 30, 1952, but the provisions relating to price and wage stabilization, settlement of labor disputes, and credit controls expire June 30, 1951.

The President may provide direct loans to private business enterprises for expansion of capacity, development of technological processes, or production of essential materials, "including the exploration, development, and mining of strategic and critical metals and minerals." Authorization is also given for purchases of or commitments to purchase metals, minerals and other raw materials, including liquid fuels, for Government use or for resale; and for the encouragement of exploration, development, and mining of critical and strategic minerals and metals.

Stockpiling

The House Appropriations Committee, in approving a nearly $17,000,000,000 supplemental military appropriations bill, has provided an additional $599,000,000 for the strategic and critical materials stockpiling program. This is in addition to the $605,000,000 included for stockpiling in the "omnibus" appropriations bill. The House Committee stated in its report that the international situation has accentuated the need to speed up the stockpiling program, especially since "purchases in a number of important materials had not progressed as rapidly as was desired." The report continued: "The funds provided will permit the building up of reserves to a point more nearly adequate to requirements for the future insofar as it is presently possible to estimate."

Munitions Board Chairman Hubert Howard recently testified that the Government hopes to have the stockpiling program 74 percent completed by the end of this fiscal year, as compared with a goal of 59 percent set before the Korean war. Jess Larson, General Services Administrator, has stated that not over 20 percent of some 10 or 12 items that are essential are in the stockpile, and that some 34 items are 50 percent short of stockpile goals.

The Senate Finance Committee has tabled the House-approved bill, H. J. Res. 502, which would have continued until July 1, 1951, the suspension of the 2¢ a pound import tax on copper. The committee did, however, report to the Senate a bill, H. R. 5327, which would continue duty-free importation of ferrous and nonferrous scrap. It is understood that the suspension of the copper import tax may be offered on the Senate floor as an amendment to the scrap bill.

Meanwhile Senator McMahon (Dem., Conn.) introduced an amendment to the general revenue bill to suspend the import tax on copper from July 1, 1950 to June 30, 1951, but his motion for consideration was defeated on the Senate floor.

Manpower Hearings

Senator Murray (Dem., Mont.), Chairman of the Subcommittee on Labor-Management Relations, has now postponed hearings scheduled to begin September 5 on wartime labor dispute procedure and wartime restrictions. The Subcommittee plans to consider: (1) the peaceful settlement of disputes; (2) the possible limitation of wages as a part of economic stabilization; and (3) the guidance of civilian manpower in accordance with production needs.

Murray has stated that the hearings will consider such questions as: Is there a need for setting up new wartime agencies? Should the administration of a wartime labor relations agency be tripartite in character? Should wage stabilization and dispute machinery be incorporated under a single authority? What, if any, are the limitations of the Taft-Hartley Act with respect to the settlement of prospective wartime disputes? What should be the extent of the Government's seizure powers?

"This series of hearings," the Senator said, "will provide the opportunity for the Senate to hear the opinions of representative spokesmen from the Government, labor, management, and the public on the extent of Government controls in the field of labor-management relations in the period ahead. Emphasis will be put on concrete proposals for dealing with the labor-management problems arising out of the emergency situation."

Fuels Study

The Myers (Dem., Pa.) measure, S. Res. 329, providing for a study of fuel reserves and calling for recommendations on national fuel policy, has been approved by the Senate. The study will be conducted by the Committee on Interior and Insular Affairs and the report and recommendations are required by January 3, 1951. Chairman O'Mahoney is expected to appoint a subcommittee to carry on this work.

Metals for War

Estimates by the experts on additional quantities of meals to be required for the war effort raises steel from the present 1½ percent of total mill output up to aproximately five percent, or, military needs will be increased by approximately 3,500,000 tons a year.

Military needs for copper will jump from less than three percent of U.S. supply to 10 or 11 percent, meaning an extra drain of 100,000-120,000 tons per year.

Aluminum consumption by the armed forces will be boosted from a present 2½ percent to something in the neighborhood of 12 or 15 percent, or an additional 100,000-130,000 tons per year. The rate of increase of aluminum consumption for defense will hinge upon the speed with which plants can be converted to work on aircraft and other equipment requiring aluminum.

An additional 30,000,000-40,000,000 lb of manganese will be needed by the military program boosting its total requirements to close to the 60,000,000 lb annual mark.

Zinc for the armed program will rise from the present three percent of U. S. supply to the vicinity of 10 percent, requiring an additional drain of around 70,000-80,000 tons.

AMC Personals

L. F. Minor, general mine foreman, Imboden mine, Stonega Coke & Coal Co., has been named superintendent to succeed **Thomas Green,** who retired recently. **Elbert Edens** has been named general mine foreman and **L. N. Christian,** assistant mine foreman. **J. M. Lowman,** superintendent, Stonega mines, has been appointed head of the company's power and mechanical departments and **W. L. Young,** former assistant superintendent of the Glenbrook mine, has been named superintendent at the Stonega property.

Francis H. Brownell, director, American Smelting and Refining Co., was awarded the Rand Medal for distinguished achievement in mining administration. The citation of the award made by the board of directors of the AIME reads "For sound leadership in the administration of nonferrous mining and metallurgical enterprises and for outstanding contributions to society in financial and legal matters relating to the nonferrous metal mining industry."

Francis H. Brownell

Joseph Q. Berta has been named superintendent of the Reliance mine of the Union Pacific Coal Co., Rock Springs, Wyo., to succeed **William Spence. Tony Toucher, Jr.,** has been appointed superintendent of the Superior mine to succeed Mr. Berta and **George Powers,** formerly mine foreman, has been named assistant superintendent at Superior.

Sinclair B. McCoy, for the past five years general traffic manager for International Minerals & Chemical Corp., has been appointed assistant to **A. Norman Into,** vice-president in charge of the potash division.

On August 1, **Bruce Payne** became chairman of the board of Pattison & Bowns, Inc., one of the sibsidiaries of the Pittston Co. Mr. Payne is a director of the Anthracite Institute and a director of the Anthracite Operators Association and one of the three operator members of the Pennsylvania Allocation Board.

Hugo Johnson, manager of the Midvale plant, United States Smelting Refining and Mining Co.; **C. R. Fish,** ore buyer and assistant to the general manager, American Smelting and Refining Co.; and **James K. Richardson,** industrial engineer, western mining division, Kennecott Copper Corp., were recently elected directors of the Utah Mining Association. **Darwin J. Pope,** manager of the mining department, American Smelting and Refining Co., and **E. R. Goodner,** president, American Gilsonite Co., were elected to represent the association on the board of governors of the Western Division of the American Mining Congress.

Jesse S. Core, former chief engineer, coal mining properties, Youngstown Sheet and Tube Co., has been appointed chief engineer for the Island Creek Coal Co., Pond Creek Pocahontas Co., and the Marianna Smokeless Coal Co. **D. H. Dowlin,** former chief engineer, Buckeye Coal Co., has been named chief engineer to succeed Mr. Core at the Youngstown Sheet and Tube Co.

Robert G. Kenly was recently named assistant general sales manager for the New Jersey Zinc Sales Co. **F. W. Jones** was appointed manager of the pigment division and **Ernest H. Klein** manager of the metal division.

W. P. Thurston, Richmond, W. Va., and **G. A. Sandmann, Jr.,** Cleveland, have been named special assistants in the coal traffic and development department of the Chesapeake and Ohio Railway.

A. H. Wohlrab, vice-president and general manager of the Calumet Division of Calumet and Hecla Consolidated Copper Co., retired on August 1, in accordance with the company's retirement plan. He will continue to serve the company as consultant in connection with the company's zinc operations at Shullsburg, Wis. **O. A. Rockwell,** assistant general manager, has been named general manager of the division to succeed Mr. Wohlrab.

Robert G. Pfahler, mining engineer for the Berwind White Coal Mining Co. at Windber, Pa., has been transferred to the company's Philadelphia office.

Warren Severson has been promoted to foreman of the Morton mine of the M. A. Hanna Co. at Hibbing, Minn. The Morton property is under conversion from an underground mine to an open pit mine. **John Howes** has been named manager of the engineering office of the M. A. Hanna Co. at Cooley, Minn. to succeed **Robert Van Evera** who was assigned to the Cooley district mines as pit foreman.

Davis Read, who recently resigned his post with the West Kentucky Coal Co. as chief engineer in charge of all mining operations and related production matters, has entered private practice as a mining consultant at Madisonville, Ky.

In his 43 years with the West Kentucky Coal Co., Mr. Read was active in the American Mining Congress, taking part in coal mining conventions as speaker, chairman and a member of the Program Committee. In addition to serving as a consultant on a professional basis, Mr. Read will continue to act as mining consultant for the West Kentucky Coal Co.

Louis C. Ball has been named assistant to the general manager of Kaiser Gypsum, a division of Kaiser Industries, Inc.

John D. Cooner, safety engineer for the Hudson Coal Co., and a member of the staff since 1916, has resigned to accept the post of mining engineer in charge of mining research for the U. S. Bureau of Mines at the new anthracite research laboratory near Schuylkill Haven, Pa. **Karl T. Miller,** who has been with the Hudson Coal Co. continuously since October, 1910, has been appointed to the post of safety engineer for the company. Until his new appointment he had been serving the company in the newly created post of dust engineer.

Karl T. Miller

J. S. Besser of Denver was elected president of the Colorado and New Mexico Coal Operators Association at the annual meeting in Denver. **G. R. Harris** of Denver was elected vice-president, **J. R. Kastler** of Raton was elected second vice-president, and **O. F. Birdwell,** secretary-treasurer.

Van B. Stith, general superintendent, Anchor Coal Co., Boone County, W. Va., has been appointed vice-president—mines, according to a recent announcement from Frank L. Hornickel, president.

Frank Zbacnik was recently named pit foreman of the Grant iron mine at Buhl, Minn., operated by the Inter-State Iron Co.

Earl R. McMillan of Seattle, Wash., was elected president of the Washington Coal Producers Association at the annual convention in Seattle. Other officers are: **William Strain**, first vice-president; **Harry Merbach**, second vice-president, and **R. W. Clark**, secretary-treasurer.

Harold J. Vollmer, traffic manager of Hillman Coal and Coke Co., resigned late in July to become district manager of the C. L. Amos Coal Corp. Mr. Vollmer has been associated with the coal and coke industry since 1918.

R. O. Tynnonen, mining engineer with the U. S. Bureau of Mines at Duluth, is now visiting mines to study the advancements made in roof bolting. Upon completion of this study tour he will return to the Duluth office.

Joseph T. Berta, president, Pennsylvania Coal & Coke Corp., has announced the following appointments: **Harold B. Wickey**, formerly general manager, as vice-president in charge of operations; **Francis X. Lee** as vice-president and secretary; and **Andrew E. Heinrick** as treasurer. In addition, Mr. Lee will continue as controller.

In announcing the personnel of its natural resources committee for the coming year, the Chamber of Commerce of the United States has included the following members of the coal mining industry on the 39-man committee: **E. R. Keeler**, chairman of the board, Franklin County Coal Corp.; **A. L. Lynn**, vice-president, Island Creek Coal Co.; **James Prendergast**, vice-president, M. A. Hanna Co.; and **O. L. Scales**, vice-president, Enos Coal Mining Co. Members for minerals are **Edwin C. Barringer**, executive vice-president, Institute of Scrap Iron and Steel, Inc.; **Elmer Isern**, president, Eagle-Picher Mining & Smelting Co.; **Evan Just**, editor, Engineering & Mining Journal; **Lawrence Litchfield, Jr.**, vice-president, Alcoa Mining Co.; **Donald H. McLaughlin**, president, Homestake Mining Co.; **William Wallace Mein, Jr.**, vice-president, Calaveras Cement Co.; and **F. S. Mulock**, president, U. S. Smelting, Refining & Mining Co.

—Obituaries—

Alfred H. Bebee, 50, general manager of the Carlton Mining interests, died on June 24. At the time of his death he was director, vice-president and general manager of the Golden Cycle Corp.

Since 1915, when he graduated from the Colorado School of Mines, he had been active in the Cripple Creek district. He had served on the staff of many famous gold producers including the Portland Gold Mining Co., Tonopah Ajax Mining Co., Vindicator Mines, and Cresson Consolidated Gold Mining and Milling Co. He was in charge of driving the 32,000-ft Carlton tunnel, a project undertaken to dewater the lower levels of the Cripple Creek district.

Alfred H. Bebee

Fred Jones, commissioner of mines for the state of Colorado, died in April in Denver, Colo., following a heart attack. Following his graduation from the Colorado School of Mines in 1900, he entered the employ of the Portland mine at Victor, Colo., and continued with that company until 1928. After a three-year period associated with a manufacturing company in Pittsburgh, Pa., he returned to Denver and in 1943 was appointed state commissioner of mines.

Harold S. Arnold, technical assistant to the president, International Nickel Co., Inc., died August 7. He joined the staff of the International Nickel Co. in 1914 and has served the company in various capacities since that time.

Prior to joining the Nickel Co., Mr. Arnold was employed in 1911 by the U. S. Smelting, Refining and Mining Co. as a miner in its subsidiary company, Mammoth Copper Co., Kennet, Calif. Later he worked at the company's mine at Gold Roads, Ariz., and he had additional experience in mining and engineering in Mexico and in Missouri.

Cecil O. Dunlop, 60, president of Silver Dollar Mining Co. and Mines Management, Inc., died August 10 in Spokane. Mr. Dunlop came to Wallace, Idaho, in 1928 and became associated with Stratton Silver Summit Mining Co., which started development of the property which is now the producing Silver Summit mine. In 1934 the name of the company was changed to Silver Dollar Mining Co. and a long term lease was taken on holdings adjoining Silver Summit on the west. Mr. Dunlop developed this prospect into a producing, dividend-paying mine.

Mr. Dunlop was president of the Northwest Mining Association for the 1940-41 term and has given freely of his time and effort both to that organization and to the Western Division of the American Mining Congress. The northwest has lost one of its leading workers for the mining industry.

Albert R. Beisel, 69, former vice-president and general manager, Island Creek Coal Co., died at Huntington, W. Va., on August 13. Mr. Beisel joined the Island Creek Coal Co. in 1913 as general superintendent and became general mine manager of the company and its subsidiaries in 1915. Until his retirement in 1937 he held the office of vice-president to which he was named in 1933. An active leader in the coal industry, his influence will continue to be felt through the action of the many coal mining executives who received much of their training and experience under his direction.

Theodore Forsberg, 83, retired coal mine owner and operator, died in Jamestown, N. Y., on June 3.

Charles James (Cap) Hutchinson, 71, who led an adventurous career, died recently in a Seattle hospital. Born in Black Hawk, Colo., he went to Seattle before 1900 and participated in the gold rush to Alaska. He and his brother paddled an Eskimo kayak to Siberia in an early adventure, and participated in the Collier North Pole expedition that fell short of the Pole. He discovered tin in Alaska and was one of the discoverers of cinnabar near Morton, Wash.

Charles Moore, former president and general manager of the New Park Mining Co., died recently in Sacramento, Calif. Mr. Moore came to the Park City district in 1900 and worked in the Daly West mine and was a survivor of the mine explosion of 1902. Until the early '20s he operated mills in the area and then became interested in mining. He purchased the Park Bingham property near Keetley and incorporated it as the Mayflower Mining Co. Through a consolidation the New Park Mining Co. was formed. On the death of T. L. Walden, first superintendent of the company, Mr. W. H. H. Cranmer was selected as superintendent. Mr. Moore, together with Mr. Cranmer, were key figures in guiding the growth of the New Park Mining Co.

Eastern States

NMAC Considers Mining's Problems

On August 3, the National Minerals Advisory Council met in Washington, D. C., to consider problems arising as a result of the present emergency. Brief addresses discussing the vital importance of mining and the need for stimulating exploration and development to foster increased production were made by Interior Secretary Oscar L. Chapman, Senators Joseph C. O'Mahoney, Pat McCarran and Arthur V. Watkins, and assistant secretary of the Interior C. Girard Davidson.

A Committee on Organization and Coordination of the Mineral Industry for Mobilization was named with Evan Just of the Engineering and Mining Journal as chairman. The committee includes Alan Bateman, Arthur H. Bunker, Andrew Fletcher, Horace M. Albright, D. H. McLaughlin, Alex C. Brown, R. G. Page, Howard I. Young, S. H. Williston, L. M. Brile and C. K. Leith.

Several commodity committees of the Council were reactivated to review the existing situation in various metals and minerals, to determine present productive capacity and the extent to which this can be expanded, and the requirements for labor, machinery, steel and other materials, transportation, automotive and stationary equipment, power, fuel, water supply, etc., to achieve such expansion. A resolution was passed urging utmost caution in calling administrative, technological and other valuable men from the mining industry into the armed services. Incentives for exploration and development were urged with emphasis placed on taxation.

Man Output

Twice as many miners as are employed by the domestic coal industry produce coal for Great Britain's socialized industry. However, Great Britain produces less than half as much coal as America's free enterprise system of mining.

The latest report of England's National Coal Board discloses that, although large sums were spent for machinery and equipment made in the United States, the British mines in 1949 actually produced 28,000,000 fewer tons of coal than in 1939 under private management and with far less mechanization.

1951 Coal Convention and Exposition

WITH C. J. Potter, president, Rochester & Pittsburgh Coal Co., as chairman of the Program Committee for the 1951 Coal Convention and Exposition, the industry can look forward to an exceptionally fine meeting. Mr. Potter will be assisted by a committee of operators and manufacturers carrying out the important task of organizing convention sessions to cover topics of the greatest interest and value and selecting the best qualified speakers to present them. Suggestions as to subjects and speakers may be sent to the American Mining Congress, Washington, D. C.

From May 14-17, the public auditorium in Cleveland, Ohio, will again be the scene of a full-scale exposition of mining machinery, equipment and supplies, including every type of machine for deep mining and open-pit operation, together with the latest developments in coal-processing equipment.

All reservations are being handled by a housing bureau to assure full use of Cleveland's hotel facilities. First assignments will be made in December and all mining men are urged to send in their requests promptly, specifying arrival date and type of room preferred, to the Cleveland Housing Bureau, 511 Terminal Tower, Cleveland 13, Ohio.

LAMP IN DAYLIGHT!

Menlo

Fluoretor

has its own patented dark chamber, an exclusive feature for ultraviolet lamping independent of light conditions. Portable—weighs less than 2 pounds. Self-energized from 2 flashlight batteries. Operation at 2537 or 3660 Angstroms. Ideal for Geiger-counter confirmation. At your dealers, or write for detailed data.

Fluoretor in sturdy box, 6 different specimen holders. Choice of 2537 or 3660 Å.

$49.50 Complete

Interchangeable head for alternate wavelength $20. Same unit for 115-v 60-cycle power $42.

Menlo Research Laboratory

P. O. BOX B522 MENLO PARK, CALIF.

Roseville Mine Nears Completion

Near Roseville, Ohio, the Central West Coal Co. approaches completion of its new Roseville mine located on the Pennsylvania Railroad in Muskingum County. The new preparation plant will have a capacity of 1500 tons per day.

Gas Turbine Cost

John I. Yellott, director of research, locomotive development committee, Bituminous Coal Research, Inc., states that the coal-burning gas turbine is expected to become a formidable competitor of the Diesel-electric locomotive for road service. He said that in road service, where the average load is 60 to 75 percent of full power, the coal-burning turbine should cost $12 to $15 an hour less than the fuel cost for a Diesel locomotive.

A locomotive-size gas turbine power plant is undergoing preliminary factory tests and plans are going forward to build the first experimental locomotive composed of two units with power plants mounted on one and coal preparation equipment on the other.

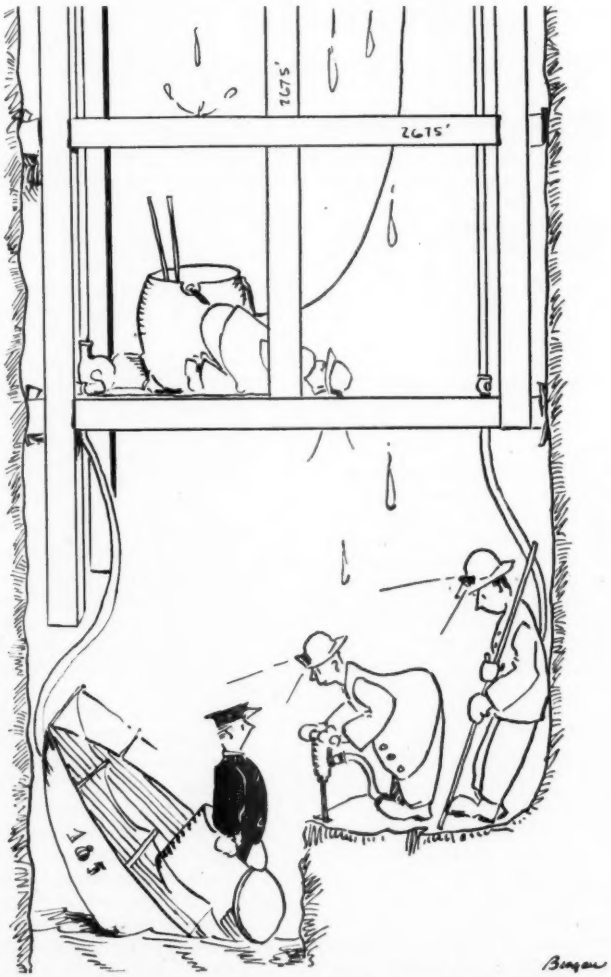
Wanted to Buy

One Model No. 6-SC Joy Shuttle Car, right hand control, four-wheel drive, four-wheel hydraulic steering, 250 volts direct current. Advise price, condition of machine, where and when available for inspection.

Address all inquiries to Box LC in care of this publication.

Fine Grinding Talc

At the operations of the Gouverneur Talc Co., St. Lawrence County, N. Y. a fluid energy reduction mill uses compressed air to make particles beat



"Could you gentlemen give me the general direction of the Navy Yard?"

against one another to produce finely-ground talc. Particles are produced in a variety of sizes with the three finest grades of 6.0, 1.5 and 0.8 microns in size.

Unique in grinding mills, the fluid energy reduction mill has no moving parts but reduces the talc by means of three jets circulating hot air at high pressure at a speed of about 1600 fps. When the talc particles are set in violent motion by this air stream they collide with each other and are reduced in size.

Largest Preparation Plant

Near Cadiz, Ohio, the Hanna Coal Co. is making rapid progress on its new central preparation plant scheduled for completion by November 1. The plant is designed with three distinct types of coal-cleaning equipment and coal will flow through the plant in three separate circuits. Plant capacity is 1500 tons per hour of raw coal or 1275 tons per hour of clean coal.

All coal will be divided into four sizes before washing; 0 by ¼-in., ¼ by 1¼-in., 1¼ by 7 in., and plus 7 in. Fine size coal will be cleaned on tables at the rate of about 300 tons per hour and will pass through flash dryers and thence to a storage bin for shipment. The ¼ by 1¼-in. coal will be fed to a huge cone at the rate of about 500 tons per hour to produce intermediate sizes to meet consumer specifications. Jigs will treat the 1¼ by 7-in. coal to provide a clean product in this higher size range.

Loading track bins are designed to load a car with minus 1¼-in. coal in less than two minutes. When the plant is running normally, a railroad car will be loaded out every 2½ minutes.

Open-Pit Communication

Open-pit phosphate mines of the International Minerals & Chemical Corp. in Florida have been granted a construction permit by the Federal Communications Commission and installation of a radio communication system has been made. When trouble occurs, the radio call will locate maintenance personnel who serve plants in the Achan, Noralyn and Peace Valley areas.

The two-way conversational set-up operates on a 60-w base station located near the main shops. Of 16 mobile units, 14 are located in automobiles used by maintenance personnel, and two have been placed on draglines. A tremendous saving of production time and improved efficieny is anticipated through the use of the radio communication equipment.

The Heart...

is as tough as the Hide!

THROW OPEN THE LIDS on this underground brute and you'll find it has a rugged, tireless heart that has kept it on the job day after day, years upon years. Its heart is a durable, dependable EDISON storage battery.

Like the machine they propel, EDISON cells are built of sturdy steel inside and out. They take extreme abuse in stride: many have fallen down shafts or been in fires or floods, and still gone back to work and served a full long life.

Electrochemically, they have no self-destructive reactions. Their electrolyte even preserves the steel parts. And they can't be injured by accidental short-circuiting or reverse charging . . . or standing idle during shutdowns . . . or even by freezing!

Because they're the best mine haulage batteries that can be made, EDISON batteries cost a little more initially. But they pay this back over and over in terms of tons hauled, years worked and down-time saved.

Write today for latest quotation. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada, International Equipment Company, Ltd., Montreal and Toronto.

EDISON

Nickel · Iron · Alkaline
STORAGE BATTERIES

Air Pollution Group Renamed

The organization formerly called the Smoke Prevention Association of America has changed its name to the Air Pollution and Smoke Prevention Association of America in expanding its scope to stimulate development of ways and means for controlling air pollution. Charles W. Gruber is president of the organization and vice-presidents are Henry F. Hebley, John L. Hodges, A. A. Raymond, J. T. Doyle and L. L. Stewart, Jr. Dr. Hamnett P. Munger, in charge of air-pollution research at Battelle Memorial Institute, is executive assistant of the organization and all mail concerning activities may be addressed to Dr. Munger at 505 King Avenue, Columbus 1, Ohio.

Weirton Coal Storage System

The Weirton Coal Co. has recently awarded a contract to the Koppers Co. for construction of a coal storage and reclaiming system at its Weirton, W. Va. coke plant. The additions and alterations will enable handling of 500 tons of coal per hour into the coal storage area. It will be possible to store about 250,000 tons of coal on the site on completion of the project.

In addition, a 600-ton capacity balance bin will be built for receiving coal from the barge unloader on the Ohio River, a 60-ton capacity Diesel-electric transfer car to deliver coal from balance bin to storage area, and an electrically operated traveling tower with grab bucket that will be used with bulldozers to store and reclaim coal.

German Coal Mining Exhibit

From September 13-24, a coal mining exhibition took place in Essen, Germany, where present hard coal mining techniques were discussed. Members of the American coal mining industry were invited to attend.

Minerals Industry Conference

On September 25-26 in Columbus, Ohio, a Minerals Industry Conference will be held sponsored by Ohio State University as a service to Ohio's diversified mineral groups. Horton H. Hampton, Cleveland, vice-president of the Nickel Plate Railroad, has been named chairman of arrangements. Frank G. Smith, Sunday Creek Coal Co., is on the program where mineral economics, taxation, water supply and stream pollution will be discussed.

Manganese Imports Gain

Imports of metallurgical grade manganese ore were 24 percent greater in the first four months of 1950 than in the same period in 1949. Approximately 514,000 tons of ore were received. Russia, the largest shipper of manganese to this country in 1948, was the smallest source in the first four months of 1950. In 1949 the USSR supplied about 15 percent of imports in the first four months of the year but in the corresponding months of 1950, Russia only supplied one percent.

Increased shipments from the Union of South Africa, the Gold Coast and India have made up the difference. Largest gains were shown by Union of South Africa, which shipped more than three times as much manganese to the United States in four months of 1950 as in the corresponding period of 1949, and accounted for about one-fourth of total imports.

Twelve more shipments from Soviet Union were resumed when a Russian freighter docked at Baltimore in mid-July to deliver 6300 tons. Most chrome imports come from Southern Rhodesia, Turkey and other countries.

Parmanco

HI-SPEED HORIZONTAL

— DRILLS —

New Traction Drive with Forward and Reverse

Are Delivering

6-INCH SHOT-HOLES

READY FOR LOADING

AT BETTER THAN

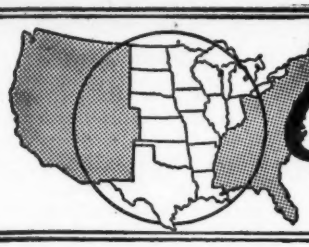
A FOOT A MINUTE!

The new Parmanco Hi-Speed Horizontal Drill is completely redesigned around a 40-H.P. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time:— a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition, the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

For BOTH MINES and CONSTRUCTION

•

PARIS MANUFACTURING COMPANY PARIS, ILLINOIS



Central States

South Dakota Gold Output Up

Production of gold in South Dakota increased 23 percent in 1949 over 1948 and was the largest since wartime restrictions on gold mining were rescinded in 1945, according to the Denver office of the U. S. Bureau of Mines. The output of silver, recovered incidental to gold mining, increased 16 percent. The Homestake mine at Lead, largest gold producer in the United States, operated at the highest production rate of the postwar period during the last six months of 1949. Since the mine resumed operations after the wartime shutdown, it has not operated a full year at normal capacity because of the limited number of men available for underground work. The full number of men required was nearly reached toward the end of the year.

Reports for the first half of 1950 indicate that Homestake's production is increasing further. Gold and silver production for the first half of 1950 has been reported at $9,417,995 by a state tax report. A total of 324,119 tons of ore was mined during the second quarter compared with 307,854 tons during the first quarter of the year. At the present time production is nearing that of prewar days.

Output from the Bald Mountain mine at Trojan, S. D., an important gold producer, was a little higher in 1949 than in 1948. Production by other South Dakota properties was small. The Bell Eldredge mine, which produced lead-zinc ore in 1948, was idle in 1949.

The state production of gold in 1949 was 464,650 fine ounces valued at $16,262,750; silver, 109,383 fine ounces valued at $98,997; and lead, 4 tons valued at $1264, a total mineral production valued at $16,363,011 compared with $13,323,894 in 1948.

Coal-to-Oil Plant Nears Completion

At Louisiana, Mo., the U. S. Bureau of Mines new gas-synthesis demonstration plant nears completion. The 80-100 bbl per day unit is designed to convert coal to oil by a modified Fischer-Tropsch process. Pulverized coal will be gasified with oxygen and superheated steam and the resulting gas will be converted to liquid fuel by passing it over a catalyst. Motor gasoline and Diesel fuel plus byproducts including alcohol, wax and acids will be produced. The process is adaptable to any grade of coal including anthracite or lignite.

This second demonstration unit can work on a wider range of coal than the 200-300 bbl per day hydrogenation demonstration plant which uses the Bergius process. Anticipated daily production of the new gas-synthesis demonstration plant will include 55-60 bbl of 75-octane gasoline, 10-12 bbl of 80-octane Diesel oil and approximately 12 bbl heavy oils and wax.

Increased Steel Capacity

On July 18 the United States Steel Corp. announced that it will increase steel making capacity by 1,660,000 ingot tons per year through an improvement program at Pittsburgh and Chicago district plants of the Carnegie-Illinois Steel Corp., its principal steelmaking subsidiary. Completion of the new program will be pushed rapidly to result in an increase of 1,215,000 tons of increase in annual steel capacity within a year. The remainder of the program, now in the engineering stage, is expected to be in production by the fall of 1951. The plants whose steel capacity is to be increased are Gary and South Works in the Chicago district, and Homestead, Edgar Thomson, Clairton, Duquesne and Ohio works (Youngstown) in the Pittsburgh district.

Plane Locates Radioactive Area

Radioactive anomalies have been located in the northern peninsula of Michigan by airborne Geiger counters. In making the announcement, Secretary of the Interior Oscar L. Chapman warned that these anomalies do not necessarily indicate the presence of uranium in quantities worth mining.

Sixty hours of flying time were required to make the Michigan studies, of which 46 hours were spent in actual survey. Traverses were flown 500 ft above the ground at quarter-mile intervals. Aerial photographs were used for pilot guidance and the flight path of the aircraft was recorded on a continuous-strip-film camera.

This survey marks a forward step in the technique of airborne prospecting for uranium, a phase that is still experimental. Pioneering developments made by the U. S. Geological Survey and the Naval Ordnance Laboratory were employed in conducting prior work to develop the method for establishing the true position of the plane in relation to groundpoints.

Lake Fleet Increase

To augment iron ore and limestone carrying capacity on the Great Lakes, two subsidiaries of U. S. Steel Corp. have decided to build four new ships immediately. The Pittsburgh Steamship Co. will order the construction of three standard bulk type ore-carriers of 18,000-ton capacity each for carrying iron ore. The Bradley Transportation Co., which transports limestone on the Great Lakes, will order the construction of one self-unloading vessel of 18,000-ton capacity. Construction of the ships will be completed in time for the opening of the 1952 iron ore shipping season, which normally begins early in April.

Industrial Minerals Meeting

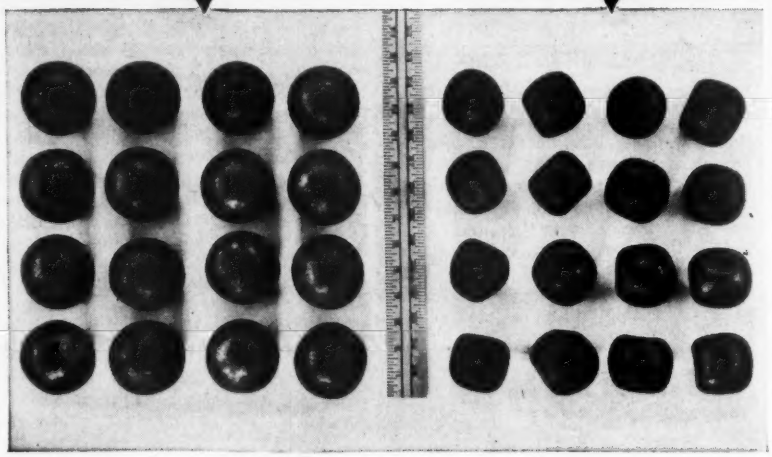
The regional meeting of the Industrial Minerals Division of the AIME is planned for October 17-20 at Norman, Okla. The three-day program includes a series of papers by outstanding specialists in the industrial minerals field and a field trip to the Arbuckle Mountains for inspection of industrial minerals deposit and operating plants.

DAVIS READ
Mining Consultant
Modern Production Methods
Plant Design—Preparation
235 East Noel Ave.
Madisonville, Kentucky

L. E. YOUNG
Consulting Engineer
Mine Mechanization
Mine Management
Oliver Building Pittsburgh, Pa.

J. W. WOOMER & ASSOCIATES
Consulting Mining Engineers
Modern Mining Systems and Designs
Foreign and Domestic Mining Reports
UNION TRUST BLDG.
Pittsburgh, Penna.
NATIONAL BANK BLDG.
Wheeling, W. Va.

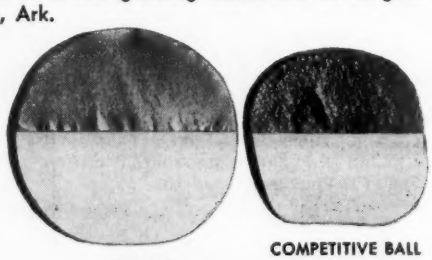
SHEFFIELD
M-LY-C-P
COPPER-MOLYBDENUM-ALLOY
VS.
COMPETITIVE
FORGED BALLS



THERE *IS* A DIFFERENCE IN FORGED STEEL BALLS

Again, the longer wearing qualities of Sheffield Moly-Cop balls have been demonstrated. This time in a test grinding barite ore at Magnet Cove Barium Corp., Malvern, Ark.

An equal number of Moly-Cop and competitive forged steel balls were charged into the same mill at the same time and were recovered after 4604 operating hours. All were originally 3½ inch nominal diameter and marked for identification.



MOLY-COP COMPETITIVE BALL

The recovered test balls are shown in the top photograph. Clearly evident is the difference in rate of wear. The *competitive forged balls* wore 38% *faster,* based on average diameter loss. Note also the pronounced difference in retention of spherical shape.

Typical fractures of the two types of test balls are shown in the lower photograph. Note the fine, hard, martensitic grain structure of the Moly-Cop ball.

The economy of Moly-Cop balls has been borne out in reports from all over the world. A comparative test in your own mills will demonstrate just how much more economical are Moly-Cop balls in your grinding operations.

Carbon and Alloy Steel
Ingots, Blooms, Billets, Plates,
Sheets, Hot Rolled Bars,
Steel Joists, Structural Shapes,
Reinforcing Bars,
Welded Wire Mesh,
Wire Products, Wire Rods,
Fence, Spring Wire,
Nails, Rivets,
Grinding Media, Forgings,
Track Spikes,
Bolt and Nut Products

SHEFFIELD STEEL
CORPORATION
HOUSTON KANSAS CITY TULSA

Export Representative:
ARMCO INTERNATIONAL CORPORATION
MIDDLETOWN, OHIO

Acknowledgment

In Henry F. Hebley's article published in the August issue of "Mining Congress Journal" and entitled "Neutralizing Acid Mine Water" there was omitted inadvertently an acknowledgment that should rightly be given to Professor E. F. Eldridge of Michigan State College and to the McGraw Hill Book Company. The section of Mr. Hebley's article describing the biological oxygen demand was quoted from Professor Eldridge's book "Industrial Waste Treatment Practice" published by the McGraw Hill Book Company. We apologize for this inadvertent omission.

Safety Council Meets

The 38th national safety congress and exposition will be held October 16-20, Chicago, features sessions on industrial safety, traffic safety and commercial vehicle sessions.

PM Develops Berkshire Shaft

At Caspian, Mich., Pickands, Mather & Co., operating agents for the Verona Mining Co., are developing the Berkshire shaft to be a central hoisting unit to handle iron ore produced from the adjacent Buck group including the Baltic, Fogarty and Berkshire properties. In the rehabilitation of the Berkshire surface plant and shaft are new surface stock-pile facilities and a new haulage level.

Zenith Shaft Dismantled

At Ely, Minn., Pickands Mather & Co., operators of the Zenith underground mine, removed the steel head frame to be cut into scrap. The mine will continue to produce through the new No. 3 shaft, originally a bore hole drilled out to 5½ ft diam and later stripped down as a standard rectangular shaft to a depth of 1200 ft.

Man Trip Car Uses Magnetic Brake

A safety man trip car built by the men at Mine 43, Peabody Coal Co., Harrisburg, Ill., employs a magnetic brake, controlled by the governor along the lines of the man trip car described in the September, 1949, issue of MINING CONGRESS JOURNAL.

The Peabody man trip car has a capacity of 24 men. Normally the car operates at 420 fpm. When a speed in excess of 475 fpm is reached, the governor goes into action to reduce speed. An additional safety feature is a switch at each end of the car for manual excitation of the governor.

Illinois Mining Institute Annual Meet

On November 17, the Illinois Mining Institute will hold its 58th annual meeting at the Hotel Abraham Lincoln, Springfield, Ill.

Surface Water Scalped at Homer Mine

At the Homer mine of the M. A. Hanna Co. at Iron River, Mich., surface water is scalped off before it reaches underground workings. Water is handled by 14 electrically-driven, deep-well pumps with the drive motor located on the surface. Combined capacity of the pumps is 6700 gpm.

Mining Electrical Group Meets

Preparations are now under way by the Mining Electrical Group of Southern Illinois for the 1950 manufacturers exhibit. The event will take place at the Franklin County Country Club, West Frankfort, Ill., September 26-28. Inquiries should be addressed to H. T. Sutherland, Box 189, Marion, Ill.

Engineer Employment

In an announcement made recently by Professor J. Murray Riddell, head, department of mining engineering, Michigan College of Mining and Technology, Houghton, Mich., it was stated that all of the 1950 crop of graduates have been placed in jobs. Of the 600 BS degrees granted early in June, 27 were in mining engineering.

Mine Air Cooling

To provide more comfortable working conditions and eliminate hazards resulting from condensation, a recently developed air cooling system has been installed at Mine No. 40 at the Peabody Coal Co., Galatin, Ill. Air entering the air slope passes a series of water sprays located about 50 ft down the slope. In addition, a rack of ice located 25 ft down the slope constitutes a part of the cooling system. When the air passes over the ice and through the water spray it has been reduced to approximately 66-68 F.

Sizes and accessories for your individual requirements. Write for information and sample.

BEMIS BRO. BAG CO.
111 No. 4th Street, Box 35, St. Louis, Mo.

Thor

REVERSE FEED OR STANDARD FEED

STOPERS

THREE SIZES—TWO STYLES—SIX MODELS

From the compact Model 200 to the heavyweight Model 600... here is drilling versatility to meet every hard rock requirement.

REVERSE FEED MODELS are now available in all sizes, permitting column or bar-mounting as shown in illustration above.

For on the job demonstrations, write or wire Independent Pneumatic Tool Co., Aurora, Ill., or Los Angeles, Calif.

STOPER LEG

Adapts Thor No. 38 Sinker to double duty as Sinker or Stoper. Write for Circular IE-1132.

Thor PORTABLE POWER TOOLS
ELECTRIC • PNEUMATIC

Western States

Montana Mining Meeting

In Butte, Mont., July 30-31, the Mining Association of Montana held its eleventh summer convention with more than 400 members attending from 11 states. The principal address was that of R. H. Glover, western general counsel, Anaconda Copper Mining Co., given at the closing banquet. He spoke on the relations of large and small mining companies. Governor John Bonner of Montana gave a welcoming address at the same meeting, and praised the work of Carl Trauerman, secretary of the association, for his work on behalf of the industry.

Mr. Glover emphasized the tax menace facing large and small mining companies alike. "As the tax rates increase, mining resources decline," he said. "When the burden becomes too heavy, mines are shut down, ghosts invade our mining camps, men lose their jobs, suppliers lose their trade, stockholders lose their dividends, processors and refiners lose their raw material, and Uncle Sam and the state lose their taxes on the profits of the operator, the wages of labor, the royalties of the owner, the profits of the tradesman."

Tom Lyon, consulting engineer, International Smelting and Refining Co. gave an address on "Silver." Another talk was presented by Julian W. Feiss, assistant to the director of the U. S. Bureau of Mines, who described research work going on at Mount Weather, Va., where the Bureau is attempting to solve some of the problems facing the mining industry.

Tribute was paid to Dr. Francis A. Thomson, president of the Montana School of Mines. Dr. George A. Selke, chancellor of the University of Montana, in praising Dr. Thomson in his talk "The Lode of Greatest Value," said it was appropriate that "the representatives and guests of the Mining Association of Montana pause in their deliberations to pay merited tribute to one of its veteran associates." He declared that the School of Mines "under his dynamic leadership has won national and international acclaim for its excellence." Dr. Thomson has been head of the school for 22 years.

Three major addresses were given at the second business session: F. A. Linforth, assistant to the vice-president, Anaconda Copper Mining Co., talked on domestic manganese resources. He cited figures showing that the United States produces only about 10 percent of the manganese it uses. Present annual consumption is about 1,500,000 tons a year: 97 percent of the domestic production comes from Montana. As recently as 1948, he said, 38 percent of this material was imported from Russia but now only nominal amounts come from that country.

He estimated present deposits of manganese, 8 percent grade or better, in Butte at 370,000 tons. In the Phillipsburg area, he believes there are about 1,000,000 tons of 12 percent manganese. Two other states, Virginia and Arkansas, are also producers of manganese. Mr. Linforth declared that this country is now a have-not nation in manganese and urged development of low grade deposits. These include the Chamberlain district of South Dakota where he estimated deposits of 2,486,000,000 tons of 1½ percent material is available, the Cuyuna Range in Minnesota, Artillery Peak, Ariz., and the Three Kids district of Nevada. Although these offer real technical problems, both of a mining and metallurgical nature, he advocated that we continue research to develop manganese at low cost.

Evan Just, editor, *Engineering and Mining Journal*, spoke on the impact of the present unsettled world conditions on domestic mining. He forecast increased mining activity to meet present and growing needs. He predicted the next few years will "try our morale to the utmost" but he optimistically thinks Americans are equal to the test. "It would be tragic," he said "to permit the mining industry to slump and development work to be abandoned, as it was in the last war." He forecast higher taxes, price controls within the next few months, eventual job, wage and profit freezing, subsidies to marginal producers, and government assistance for exploration and development.

The final speech was that of Dr. John P. Spielman, dean, School of Mines, Washington State University. In his talk, "Dollars and Senses" he expressed the belief that America has been foolhardy in not maintaining development, exploration and research during peacetime. He illustrated his talk with an example familiar to all Montana mining men—that the government conducted feverish activity during two World Wars at the chromite deposits in Stillwater, Mont., then let the mine cave and sold parts of the plants during times of peace. He made a strong appeal for prospecting known deposits of mineral wealth for means of developing them.

In addition to the business sessions, the banquet and the luncheon, the program included entertainment features and a trip over Butte hill to view the operations of the Anaconda Copper Mining Co., including the Greater Butte Project.

O. P. Chisholm, president, Mining Association of Montana; Mrs. Francis A. Thomson; Dr. Francis A. Thomson, president, Montana School of Mines and chairman, executive committee, Mining Association of Montana; Dr. George A. Selke, chancellor, University of Montana; and Carl J. Trauerman, secretary-manager, Mining Association of Montana

Copper-Gold Development

In the Cienega Mining District, near Parker, Ariz., the Associated Mining Co. has started development of a group of copper-gold mines. A. P. Lofquist, mining engineer, is directing the work. This concern, headed by A. C. Burger of St. Louis, Mo., acquired under long-term leases the Rio Vista, Billy Mack Sue, Capilano, Mammon and Lion Hill mines, and proposes to consolidate them into one large operation. Major interest in the leased properties is owned by Mrs. Clara Osborne Botzum, H. M. Osborne, and E. S. Osborne, all of Parker.

Initial work will be concentrated on the Rio Vista and Lion Hill mines. The 287-ft double-compartment shaft at the Rio Vista South is being unwatered, the headframe rebuilt and the shaft repaired. New cages, pump, ventilating equipment and air lines are to be installed, and mine buildings constructed. When this phase of the work is completed, exploration on the 250-ft level will be undertaken. At the Lion Hill, the main tunnel is to be continued for about 600 ft. A mill building capable of housing a 300-ton plant is located at the Rio Vista.

Later work to be undertaken includes the extension of the 244-ft incline shaft at the Rio Vista North, additional exploration in the 90-ft vertical shaft at the Capilano, and sinking a new double-compartment shaft at the Sue to avoid flood waters in the old workings. In addition, an extensive program of core drilling is planned for the Rio Vista South and Mammon.

Silver City Zinc

Two new zinc producing mines have been added to three regular producers, namely, Empire Zinc Co., U. S. Smelting Refining & Mining Co. and the Peru Mining Co. The Oswaldo No. 1 and the Oswaldo No. 2 mines of Chino Mines Division. Kennecott Copper Corp. have started operations on a two-shift schedule and are expected to add a third shift in the immediate future on a seven-day week. Thus, with five zinc mines operating, the Silver City District becomes one of the largest zinc producing districts in the United States.

Synthetic Mica Produced

By means of a new "cool hearth" method, cakes of mica, weighing up to 500 lb, have been formed at the Colorado School of Mines, Golden, Colo. Unlike the method carried out by the U. S. Bureau of Standards at Washington, D. C., and the U. S. Bureau of Mines at Norris, Tenn., the new process avoids use of crucibles. The molten mica is contained in a basin of unmelted raw mixture from which the melt was derived. Research to develop the "cool hearth" method was carried on in a four-year project under grant from the Signal Corps.

Dr. Wm. C. Aitkenhead, director of the research project and a member of the faculty of the Colorado School of Mines since 1937, is now director of the mining research laboratory at Washington State College, Pullman, Wash.

The Full Report

of the

1950 METAL MINING CONVENTION

will be published in the OCTOBER issue

California Iron Exploration

At Iron Mountain, near Redding, Calif., two deep diamond drill-holes are being put down under the direction of the U. S. Geologic Survey. Surface geologic mapping there is believed to indicate a favorable structure for ore deposition, which will be prospected by the drill-holes. The contract for drilling has been awarded to R. C. McClintock of Spokane.

Tombstone Activity

Mayor John P. Giacoma of Tombstone, Ariz., reports the shipment of more than six carloads of silver ore from property which he is leasing from the Tombstone Development Co. He is employing five men at the old Prompter-Oregon mine, and is taking out ore from the 300-ft level that is said to run from 18 to 40 oz silver to the ton. Giacoma estimates that the old property during its most productive period (1917-1922) produced more than $1,000,000 worth of metal, and that during World War I it was considered one of the richest manganese properties in the country. He was in charge of operations during the 1920-1922 period, employing 250 men and producing two cars of silver ore daily.

... the new separable

FLEXCO HINGED

BELT FASTENERS

U. S. Patent No. 2,477,855

- For joining underground extension conveyors.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates smoothly through take-up pulleys.
- Strong, durable . . . pull or tension is distributed uniformly across joint.
- For conveyor belts ⅜" to ½" thick.

Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO

4675 Lexington St., Chicago 44, Ill.

Diamond Drilling at Grass Valley

Ore possibilities are being explored by diamond drilling in areas owned by Empire-Star Mines and Idaho-Maryland Mines Corp., at Grass Valley, Calif. Empire-Star started a diamond drilling program last year for investigating numerous prospects and important veins were located within the last three years in Idaho-Maryland property by intensive drilling.

Approximately 30 leases are operating in the Empire, Pennsylvania and North Star properties of Empire-Star Mines, with activity largely centered in deep workings of the North Star. Leasers completed 7324 ft of development work in 1949. The leasing system was first used by Empire-Star at its North Star property in 1930, and resumed on January 1, 1947, as the only way to continue mine operations.

Idaho-Maryland drilled 10,214 ft of holes with diamond drills last year, resulting in discovery of an important ore body on the 2400-ft level of the Idaho property and location of other promising veins. Drilling continues on the 2700-ft level and in other parts of the mine. The company has accelerated development and mining of the vein discovered on the 2700-ft level of the Idaho in 1948, and is reopening a productive area in the 1500-ft level workings. A new crushing unit has been placed in operation at the Idaho mill, and preparations are underway to erect a steel headframe and ore bin at the old Brunswick shaft. Idaho-Maryland is reported milling approximately 20,000 tons of ore monthly, with the bulk of tonnage handled by the Brunswick plant.

Lone Star Mine Sold

The Lone Star fluorspar mine has been acquired by the Pepperdine Foundation of Los Angeles, and Joffre Marcil and Henry Boherman, also of Los Angeles. The Lone Star, located in the Whetstone mountains 15 miles southwest of Benson, Ariz., has been owned and operated by Cooper Shapley, Jr., since 1946. Production has been averaging about 100 tons of high-grade fluorspar monthly. Jack Ross, formerly of Los Angeles, has taken over the job of mine superintendent for the new owners. Frank Wicks, general manager, will remain at the Los Angeles office.

International Mining Days

Annual feature of southwestern mining, International Mining Days for 1950, will be held in El Paso, Texas, October 12-14. Plans are well underway by the International Mining Day's Committee with R. S. Beard as Chairman.

International Mining Days will be combined with the regional meeting of the AIME Industrial Minerals Division to give visitors the maximum in a fine technical program. Visiting miners will again have some top flight entertainment and will be the guests of the El Paso suppliers on the evening of Friday, October 13. On Saturday night, October 14, visitors will have the opportunity to see Texas Western College meet the University of Arizona in their annual gridiron battle.

Round Mountain Gold

Round Mountain Gold Dredging Co. is operating its giant placer mining plant at approximate capacity and is, perhaps, the foremost gold producer in Nevada. The huge electric shovel is gradually working from the base of the mountain, where more than $5,000,000 was taken from lode mines in early years of the Round Mountain region, toward the deeper gravel deposits, at some places more than 300 ft deep. The shovel has a 7-cu yd scoop.

Equipped with a large ball mill, washing plant and gold recovery units, the plant was designed to handle a minimum of 17,000 tons of alluvial gravel daily. Three men on a shift are employed at the plant, a small crew at the placers, and all equipment is operated by systematic controls. The plant is the largest of its type in the world and is reported operating at high efficiency.

The company recently added a powerful electric lift to the equipment and has improved the plant since test operations began last January. With all units operating at top capacity the company expects to recover about $3400 in gold daily. Lode and placer properties leased by Round Mountain Gold Dredging from Nevada Porphyry Gold Mines cover several thousand acres, and the placers are estimated by company officials to contain 67,000,000 tons of alluvial gravel. Operations are expected to continue 12 years or longer.

Galena Shaft Reaches Sea Level

At the 2930-ft level, the Galena shaft has been put down to sea level. The project was undertaken by the American Smelting and Refining Co. which put up 75 percent of the cost of the shaft and Day Mines, Inc., which put up 25 percent. Completion of the Galena shaft raises to five the number of deep development programs in the "dry belt" south of the Osborn fault of the Coeur d'Alene District of Idaho. These are the Sunshine with 3700 ft; the Silver Dollar with 2800 ft; Silver Summit with 3400 ft; Coeur d'Alene Mines with 2800 ft; and now the Galena or Vulcan shaft.

●Don't be satisfied
Until you have drilled with
ROK-BITS CROWN CARBIDES
Speeds never before possible have become commonplace on job after job which has switched to Rok-Bits CROWN carbide cutting. The answer is in Rok-Bits CROWN designed carbides—self-clearing chip channels—threads designed especially to match this bit's outstanding performance. Don't let sheer habit blind you to a better bit. Service-test Rok-Bits. Request FREE book on regrinding carbide bits. ROCK BIT SALES & SERVICE COMPANY, 2514 East Cumberland Street, Philadelphia 25, Pa. Branch: Asheville, N. C. A complete line of pneumatic tool accessories.
ROK-BIT—the only carbide bit with crown cutting edge

Leadville Tunnel Contract Let

In mid-August the U. S. Bureau of Mines named Utah Construction Co., Salt Lake City, as the contractor to continue driving the Leadville, Colo., drainage tunnel, a step towards making waterbound zinc, lead and manganese ores of the district available. Work originally began on the tunnel in December 1943, but halted in August 1945, after having driven 6600 ft. Funds were not available at that time to continue the project. Funds currently available total $500,000 and it is hoped that the tunnel will be advanced a minimum of 3500 ft with this sum.

C. F. & I. Closes Fluorspar Mine

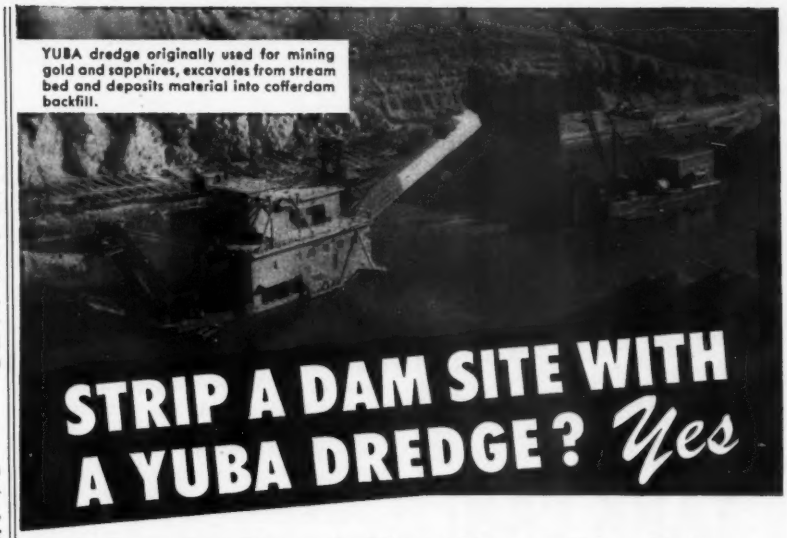
Immediate closing of the Wagon Wheel Gap fluorspar mine was announced by G. H. Rupp, manager, Colorado Fuel & Iron Corp.'s mining department, on July 29. Mr. Rupp said the shutdown will conserve fluorspar deposits owned by the corporation. Future supplies will be purchased from outside sources. The mine and mill, about ten miles south of Creede, Colo., have been operated by the C. F. & I. for 25 years.

New Phosphate Plant

Initial operations toward the construction of a new $5,000,000 electric furnace plant to treat phosphate ores by the Victor Chemical Works of Chicago were started early in August on a 480-acre area near Silver Bow, eight miles west of Butte, Mont. T. F. Edson, in charge of the plant construction, said grading and excavation work was underway, and work on drilling of a water well is near completion. Water was struck at 40 ft and the well will be finished at 400 ft.

The furnace plant will be built by the Nicholson Co., Inc., of New York. Arthur S. Martin will be construction superintendent. With the exception of a few key men experienced in furnace construction work, local Butte labor will be employed. Mr. Edson has announced that the plant construction will consist of the furnace building proper with its huge electric furnace equipment, a kiln building, powerhouse, machine shop, various office buildings and change buildings. Completion is expected in late 1951.

Elemental phosphorous will be made from phosphate rock produced in the Maiden Rock area near Butte and other nearby phosphate-ore producing regions. The ore will be taken to the Silver Bow plant for furnace heat treatment. Later, the unfinished product will be sent by rail to processing plants in California, Illinois, Tennessee and Pennsylvania. The company now operates phosphorous producing plants in those states as well as in Florida.


YUBA dredge originally used for mining gold and sapphires, excavates from stream bed and deposits material into cofferdam backfill.

STRIP A DAM SITE WITH A YUBA DREDGE? *Yes*

At Canyon Ferry Dam on the Missouri River near Helena, Montana, Canyon Constructors save months of time by using a YUBA dredge to handle dam site excavation and cofferdam backfilling in one operation instead of separately.

Dredge stacker also discharges to haul road directly into trucks or for rehandling by shovel and trucks.

DREDGE REMOVES BOULDERS

Sub-contractor Perry & Schroeder Mining Co. moved in a Yuba placer dredge with 6 cu. ft. buckets and 48 ft. digging depth, dug out boulders so sheet piling could be driven for cofferdams. Then the dredge began excavating and backfilling the cofferdams; stripped 250,000 cu. yds. of underwater overburden down to bedrock by the time the diversion flume was ready.

AVERAGES 320 CU. YDS. PER HOUR

Altogether the dredge will handle about 1,000,000 cu. yds. of material, including production of aggregate from underwater deposits. It works three 8-hour shifts daily, averages 320 cu. yds. hourly; has a reach from bucket line tip to stacker end of 250 feet and can discharge material 40 feet above water line.

Consult YUBA—No matter what your bucket ladder dredging problem—digging deep ground, clay, boulders, or bedrock; constructing levees, cofferdams or canals; producing aggregate or changing stream channels—YUBA can help you. Write or wire us TODAY. No obligation.

YUBA DREDGES — APPROVED

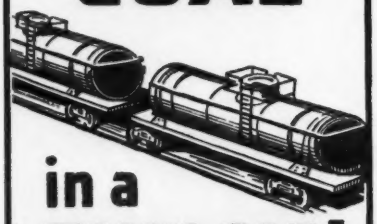
YUBA MANUFACTURING CO.

Room 707, 351 California St., San Francisco 4, California, U. S. A.

AGENTS { BIKE, DARBY & CO., LTD. · SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E. C. 3.

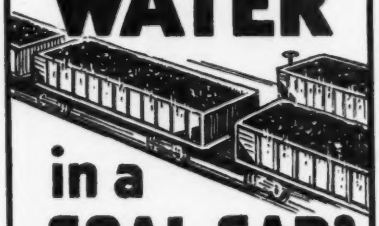
CABLES: YUBAMAN, SAN FRANCISCO · SHAWDARBCO, LONDON

You would'nt SHIP COAL



in a TANK CAR!

why SHIP WATER



in a COAL CAR?

a C·M·I Centrifugal DRYER

—will turn your slurry and "wet coal" liabilities into assets and . . . profits.

CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.
146 President St., St. Louis 8, Mo.

Manganese Ore Sought

Diamond drilling operations to locate manganese ore bodies are being conducted by the U. S. Bureau of Mines and U. S. Geological Survey, it was recently announced by officials of the Trout Mining Co., Philipsburg, Mont. Both surface and underground drilling is being done on the properties of the Trout Mining Co.

Cobalt Plant Construction

Award of a contract for construction of a cobalt refinery at Garfield, Utah, by the Howe Sound Co., was made to the Utah Construction Co., on August 1. Work was expected to start immediately on the plant, cost of which previously had been estimated by the company at $1,200,000.

The project is expected to be in operation by mid-1951 processing concentrates made from ore mined at the Blackbird mine near Forney, Idaho. Calera Mining Co., a wholly-owned Howe Sound subsidiary, operates the mine and is expected to operate the refinery for the parent company.

Bastnasite Property

Following the discovery of bastnasite, the fluocarbonate of cerium and lanthanum, made late in 1949 near Mountain Pass, San Bernardino County, Calif., the Molybdenum Corporation of America has started development work. At present a two-compartment shaft is being sunk to the 100-ft level from which point it is planned to drive cross-cuts to the two largest veins.

Coronado Copper Reopens

The Coronado Copper and Zinc Co., Dragoon, Ariz., is proceeding with its reopening of its property and the mine payroll now numbers about 75 men. Two pumps are in operation at the Republic shaft which is being cleared of water from the 1500 to the 1600-ft level. Sinking of the Moore shaft, a half-mile to the north of the Republic, has been resumed and will be carried to the 600 level. The work is being done under contract by C. S. Elayer of Silver City, N. M. According to Fred E. Gray, manager, the company hopes to have the mill in operation before the end of the month.

Plumbic Mine Lets Contract

Plumbic Mines Co., has let a contract to McFarland and Hullinger of Tooele, Utah, for sinking of an incline on its Jeepster No. 3 claim in the uranium district near Marysvale, Paul H. Hunt, president of Plumbic announced recently. Plans are to drive the incline to a point where monzonite is expected to be encountered, then to crosscut. A road is now being built to the claims. Mr. Hunt said that should ore be found in driving the incline, plans are to start some 350 ft down the mountainside and drive a crosscut tunnel into the orebody.

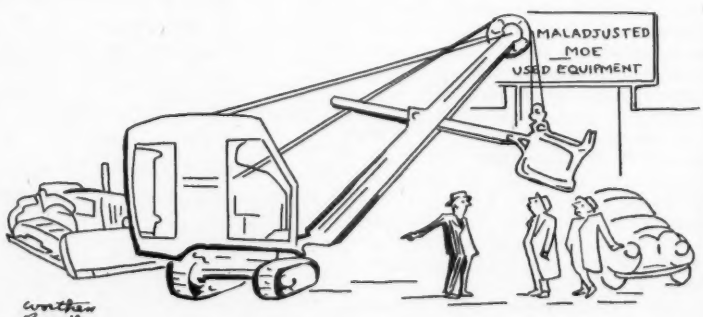
Nevada Gold Mill

San Francisco Engineering and Milling Co. is operating the Nevada Gold mill, about eight miles west of Goldfield, Nev., on a 24-hour basis, according to John Gargan, president. The plant has a capacity of 60 tons daily and is running on low grade dump ore to iron out "bugs" in the flowsheet. It will handle custom ore from the gold and silver properties in the district.

Elkhorn Ships Uranium Ore

Commercial uranium ore has been shipped from the Free Enterprise mine near Boulder, Mont., by the Elkhorn Mining Co. The ore was shipped to an Atomic Energy Commission licensed uranium ore buyer, according to Wade V. Lewis, president of Elkhorn. The shipment was made one year and ten days from the date of discovery.

The Elkhorn company is operating under AEC producers license, 0-505, the first license issued in Montana.

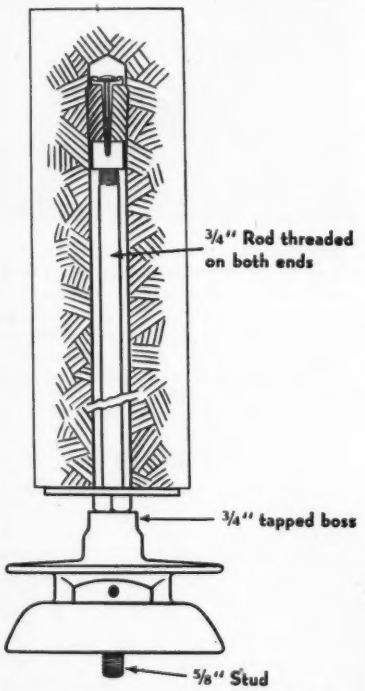


"This machine was owned and operated by two little old ladies who never had it out of the pit."

Manufacturers Forum

Mine Hangers

Hangers that can be attached directly to the protruding ends of roof support threaded rods are available



from the Ohio Brass Co., Mansfield, Ohio. After the roof bolt rod has been installed in the regular manner, the type K-3 mine hanger, made with a ¾-in. tapped boss, can be attached directly to the rod end.

Plastic Seal Stoppings

A plastic film developed by the Hollingshead Corp., Camden 2, N. J., in cooperation with the General Electric Co., is designed to make dry stoppings and brattice cloths air tight and to seal off mine fires. Called G. E. Cocoon, it is reported that the plastic can be sprayed directly on dry stoppings, brattice cloth and overcasts with standard spray equipment to form a durable, fire-resistant seal. The plastic film has been tested in a number of coal mining operations and is said not only to contribute to better air control by sealing stoppings completely but also to help prevent seepage of moisture into the coal and the eventual breakdowns in ribs and roof which can result from such seepage.

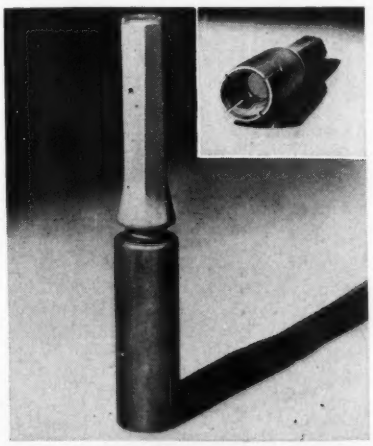
Rigid Plastic Pipe

Carlon rigid plastic pipe designated "L" has been announced by the Carlon Products Corp., Cleveland 5. The new pipe is said to feature increased resistance to burst at high pressures as well as high tensils and flexural strengths. It is recommended for use in airlines in industrial plants and mines as well as for transmission of liquids, vapors and gases under moderately high pressure.

Formerly known as the Carter Products Co., the company name change was announced recently by Brigham Britton, president.

Bit Remover

Rock Bit Sales & Service Co. has developed a bit remover for rapid disconnection of single use bits. The

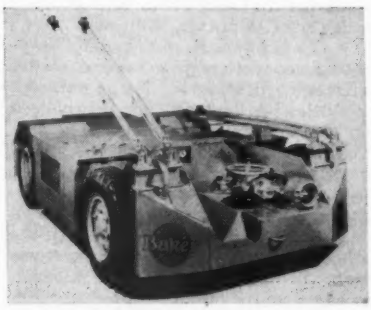


piston-type units are attached to the compressed air line to remove the bits rapidly and with no manual effort. The hole-saver designed to reclaim loose bits and broken steel from drill holes has also been newly developed for the mining industry.

Trolley Tractor for Mine Haulage

To provide a supplementary transportation system for mines using belt conveyors for main line haulage, the Baker-Raulang Co., Cleveland, has announced the type WE Trolley Tractor arranged for trolley or battery operation. By means of this new unit, main line haulage for personnel, supplies, tools, etc., may be provided.

Among the advantages claimed by



the manufacturer for this new equipment are: safety in hazardous areas when running on battery power; speed and unlimited distance for long hauls; 100 percent availability for use and no time lost in battery charging. Further information may be obtained from the company or from J. H. Fletcher & Co., Chicago, Ill., and Huntington, W. Va.

Dragline Chain

Chain for power shovel and dragline use produced by Baer Steel Products, Inc., Auburn, Wash., is cast from Fibraloy steel designed to absorb the battering required of earth-moving bucket castings. The chain made of Fibraloy is said to resist plastic deformation and provide superior shock and abrasion resistance.

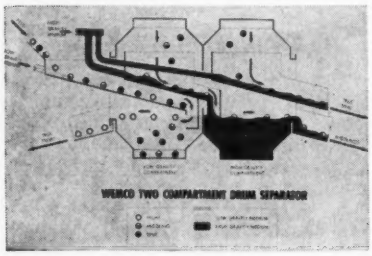
Spiral Packing

Users of "Super Seal" spiral packing produced by Crane Packing Co., Chicago, Ill., will recognize the improvement of the addition of a vulcanized tape-back now offered as an integral part of this packing. This development is said to increase flexibility and simplify ring cutting and reduce breakage.

Two-Compartment Drum Separator

A new drum separator, designed to reduce the cost of multiple stage heavy-media separation, has been announced by the Western Machinery Co., 760 Folsom St., San Francisco. Because it reduces equipment needed to produce a middling product, this multiple drum separator may have a wide range of application in the cleaning of low grade coal, iron and other minerals.

In processing low grade coal and ore, it becomes desirable to obtain a



middling fraction of "near gravity" material that can be further crushed and rerun to obtain additional recovery. To accomplish this, in the heavy-media separation process, two stages are required using liquids of different gravities. A float product is produced on the lighter gravity media, a sink product in the heavier media, and a middling product between them. The new WEMCO process uses a partitioned drum with a lighter media in one section and a heavier media in the other. Only three conveyor systems leave the drum; they carry a mineral, a waste and a middling product. Recrushed portions of the middling product join the feed material and are returned to the drum. Savings claimed for this arrangement are: fewer items of equipment, lower construction and installation costs and greatly reduced floor space.

Precision Barometer

A super-sensitive aneroid barometer reported to be accurate to 1/1000 in. of mercury is now available from the American Paulin System of Los Angeles. The new unit is said to report reliably minute changes in air pressure. Instantaneous readings may be possible without the necessity of corrections for temperature and latitude. This system of instrumentation is claimed to be the first new principle in aneroid construction in over 100 years.

Self-Priming Pump

Goulds Pumps, Inc., Seneca Falls, N. Y., recently announced a new line of self-priming centrifugal pumps designed without valves. The manufacturer states that the advantages offered by the new pumps include positive self-priming, the elimination of large and bulky priming reservoirs, no recirculation of water during pumping stage and efficiencies comparable to standard centrifugal pumps. Capacities range up to 120 gpm and heads up to 135 ft depending upon capacity. Suction lifts up to 25 ft.

Midget Puller

A handy large capacity puller for mine, shop or tipple has been announced by the Coffing Hoist Co., Danville, Ill. The hand operated unit weighs 9½ lb and is said to be able to handle a 1000-lb load on any lifting, stretching or pulling job. The 1000-lb mighty midget puller, now in production, sells for $27.50 and a smaller model, weighing only 6½ lb, with 500-lb capacity, lists at $19.75.

Soil Sampling Kit

For obtaining subsurface information, the Acker Drill Co., Scranton, Pa., offers a hand-operated, soil-sampling kit enclosed in a handy portable steel case which may be carried in any automobile. The 12 soil and earth-sampling tools can be used to obtain samples to depths up to 25 ft in practically all soil and earth formations.

Auger Bits

A new complete line of Firthite (tungsten-carbide tipped) auger drill bits with hex-shanks has been announced by the Firth Sterling Steel & Carbide Corp., McKeesport, Pa. The line was developed expressly for drilling holes for Armstrong, Airdox or Cardox shooting and bit diameters range from 2¼ in. with 13/16 in. hex-shank up to 3¼ in. with 1⅜ in. shank.

Design of the auger drill bits is said to relieve the cuttings and eliminate binding of the auger head while drilling.

New Earth Movers

Early production of two new high-speed, long haul and high-capacity earthmoving machines has been announced by Caterpillar Tractor Co., Peoria, Ill. One is a four-wheel Diesel

tractor-wagon combination and the other is a two-wheel Diesel prime mover equipped with a scraper. Production follows five years of intensive research, design engineering and job-proved application to provide earth-moving operators with equipment designed to meet their needs.

Deep Stripping

Near Raven Run, Pa., the Mammouth Coal Co. has begun stripping operations to rework an abandoned anthracite deep mine. The pit is expected to become one of the deepest cuts in the area and go 45 ft below sea level before completion. A fleet of 24 Euclid rear dump trucks are used for haulage. These units, all powered with Cummins Diesels, haul average loads of 12 cu yd on runs that extend one-mile, one-way, for the outside fill or one-quarter of a mile on the inside fill.

Three benches will be required to successfully carry out the operation to recover the 40-ft thick coal.

Two Stage Coal Crusher

A heavy duty coal crusher developed by the T. J. Gundlach Machine Co., Belleville, Ill., is designed to reduce mine-run coal to stoker coal in one operation. Operating economy and small space requirements are said to make the "Two Stage" coal crusher valuable for all types of coal mines. A number of the units, under field tests, reduced run-of-mine to stoker coal at the rate of 60 tons per hour.

Steel Hardening Compound

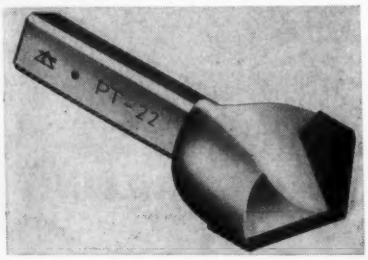
The Miracaloy Corp., New York, has announced availability of a steel-hardening compound called "Hard-N-Deep." Application of this compound is said to result in a tough, uniform case hardening without appreciable change in surface dimensions. To harden a part, it is heated to a cherry red, dipped in the compound, brought back to temperature and quenched. One treatment produces a case of about 1/32 of an inch.

Gas Turbine Production

Large-scale production of gas turbines for power plants for land, railroad and marine use has been started by the General Electric Co. in a plant at Schenectady, N. Y., now being equipped at a cost in excess of $4,000,000. Three GE-built gas turbine power plants are now in operation and their successful use indicates that the gas turbine is ready to assume a significant role in the power field.

Roof Bolting Drill

Field tests on a wide variety of designs has resulted in the development of a carbide-tipped roof bolting drill by Carboloy Co., Inc., Detroit 32. Improvements in the drill include maximum relief and clearance angles; a deep spiral on the shank body to remove cuttings; a strong braze and



maximum cutting edge angles to insure full use of cutting pressures. Packaged in lots of four units the improved drill is 4-in. long and has a drill diameter of 1⅜-in.

Non-Magnetic Separation

An agitator separator designed by the Eriez Mfg. Co., Erie, Pa., is designed to separate small amounts of non-magnetic material from large amounts of magnetic material. Physical separation is effected before the material reaches the most powerful areas of the magnetic field. The non-magnetic unit consists of a permanent magnetic pulley, the surface of which consists of alternate lengthwise "slats" of Alnico alternated with "slats" of non-magnetic material.

Material to be separated is distributed by a vibrator tray to a non-magnetic vane assembly from which it passes to the pulley belt. Induction arms from the receiving chute or vibrator tray reach over the pulley and cause a flutter in the vane assembly as they react to the north and south magnetic poles. Thus the material is fed in a thin layer into the magnetic field where separation is effected with a high efficiency claimed by the manufacturer.

Copper Production Film

A 16-mm film entitled "Copper: Mining and Smelting" has been released by Encyclopaedia Britannica Films. The color film shows large scale operations of the Kennecott Copper Corp. at Bingham Canyon, Utah. The film carries the ore right on through the mill and smelting processes.

The film may be purchased from Encylopaedia Britannica Films, Wilmette, Ill., at $90 or rented from EBF's libraries in New York, Boston, Atlanta, Chicago, Dallas or Pasadena, at $4 for one to three days' use, plus $1 for each day thereafter.

— *Announcements* —

E. D. Powers has been elected a vice-president of **American Cyanamid Co.** in charge of all matters concerning plant operations and related activities of staff departments.

William D. Pretts has been assigned to the **Allis-Chalmers** Detroit district office as a sales representative.

Wilmer H. Cordes, manager of market development and advertising of **American Steel and Wire Co.**, has been named general staff manager of the Company's sales department. He succeeds **Paul L. Lindsay**, recently appointed Cincinnati district manager of sales.

K. A. Vaughan, manager of field engineering for **Gould Storage Battery Corp.**, has been advanced to the newly-created position of manager of sales engineering.

C. R. Daniels, Inc., Baltimore, Md., has announced completion of new and expanded facilities for the manufacture of brattice cloth.

M. Russell Kambach has been named advertising manager for the **Aluminum Company of America. Jay M. Sharp** assists him as assistant advertising manager.

Edgar F. Charlton has been appointed sales engineer of the **Connellsville Manufacturing and Mine Supply Co.**, Connellsville, Pa.

The **Baker Mfg. Co.** has announced a major expansion involving an expenditure of more than $150,000 to more than double plant capacity.

F. S. Elfred, Jr., general manager, explosives division, Olin Industries, Inc., and **Robert W. Lea**, president, Johns-Manville Corp., were recently elected to membership on the board of directors of **Olin Industries, Inc.**

R. V. Gunther has been advanced to the position of assistant production manager and **L. G. Janzow** to chief engineer of the manufacturing division of **Southwestern Engineering Co.** of Los Angeles. **James F. Geary** is chief engineer of the construction division.

CATALOGS AND BULLETINS

CARBIDE TOOL MAINTENANCE. *Carboloy Co., Inc., Detroit.* A combination manual and catalogue gives detailed instructions on how to keep carbide coal mining tools in top condition. The 22-page publication covers sharpening information on coal cutter bits, finger bits, auger drill bits, pin-timbering drills, etc., and sizes, specifications and prices of these tools.

CONVEYORS. *Stephens-Adamson Mfg. Co., Aurora, Ill.* An interesting quarterly publication entitled "Conveyor" carries illustrated stories of the application of conveying equipment.

DRUM MAGNET. *Dings Magnetic Separator Co., Milwaukee.* Design application and operation of the Dings non-electric, Alnico perma-drum magnetic separator is described and illustrated in a new eight-page bulletin. The perma-drum magnet is designed specifically for tramp iron removal and concentration of magnetic substances from associated non-magnetics.

DUST COLLECTION AND RECOVERY. *Buell Engineering Co., Inc., New York 5.* In a 33-page bulletin, industrial dust recovery problems are stated and the application of dust recovering systems to correct specific conditions is described. Illustrations, charts and photographs show the manner of operation of the van Tongeren system.

PLACER JIG. *The Dorr Co., Stamford, Conn.* A 16-page, two-color bulletin entitled "The Dorrco Pan-American Placer Jig" describes the unit, designed originally as a gold-saving device for dredges, which has become widely used on all types of placer operations, in closed grinding circuits of gold mills and for coarse ore concentration.

WIRE AND CABLE FOR MINING. *Simplex Wire & Cable Co., Cambridge, Mass.* Power transmission wire and cable for a wide variety of mining services are described in detail in an attractive, well-illustrated 28-page catalog available upon request. Helpful data on cable engineering to enable selection of the proper wire and cable to meet a particular need is included along with detailed data on applications such as cable for motor leads, locomotives, shuttle cars and cutting and loading machines.

—Index To Advertisers—

	Page
American Brake Shoe Co. — American Manganese Steel Div.	20
American Brass Co., The	9
American Cyanamid Co.	10–11
Bemis Bros. Bag Co.	67
Bucyrus-Erie Co.	25
Buda Co.	21
Cardox Corp.	16–17
Centrifugal & Mechanical Industries, Inc.	72
Crane Co.	12
Cummins Engine Co.	Third Cover
Denver Equipment Co.	45
Edison, Inc., Thomas A. — Storage Battery Div.	63
Electric Storage Battery Co., The	4
Flexible Steel Lacing Co.	69
Gardner-Denver Co.	13
General Electric Co.	14–15
Hewitt-Robins, Inc.	46–47
Hoffman Bros. Drilling Co.	76
Independent Pneumatic Tool Co.	67
Jeffrey Mfg. Co.	22–23
Joy Mfg. Co.	6–7
Link-Belt Co.	Second Cover
Longyear Co., E. J.	1
Mack Trucks, Inc.	18–19
Menlo Research Laboratory	62
Mine Safety Appliances Co.	Back Cover
Mott Core Drilling Co.	76
Ohio Brass Co.	41, 42, 43, 44
Paris Mfg. Co.	64
Pennsylvania Drilling Co.	76
Read, Davis	65
Roberts & Schaefer Co.	26
Rock Bit Sales & Service Co.	70
Sanford-Day Iron Works	2–3
Sheffield Steel Corp.	66
Standard Oil Co. (Indiana)	8
Universal Vibrating Screen Co.	76
Western Machinery Co.	56
Woomer & Associates, J. W.	65
Young, L. E.	65
Yuba Mfg. Co.	71

Established 1902

HOFFMAN·BROS·DRILLING·CO.

CONTRACTORS

DIAMOND CORE DRILLING

PUNXSUTAWNEY, PA.

Our specialty—Testing bituminous coal lands
Satisfactory cores guaranteed

CORE DRILLING

ANYWHERE

"We look into the earth"

PENNSYLVANIA DRILLING COMPANY

PITTSBURGH 20, PA.

CORE DRILLING

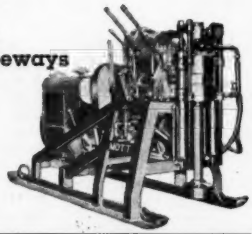
CONTRACTORS

Testing Coal Properties a Specialty
Guaranteeing Satisfactory Coal Cores

Pre-grouting mine shafts

Large diameter holes for
Drainage, Air-shafts and Escapeways

Inside Mine Drilling



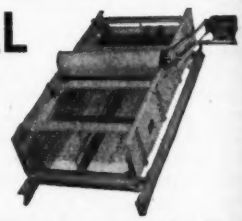
MOTT
CORE DRILLING CO.

Huntington, W. Va.

UNIVERSAL

VIBRATING SCREENS

FOR *CLEAN* AND
ECONOMICAL SIZING
OF STOKER COAL



Write today for Catalog No. 109 on Screens and Screening.

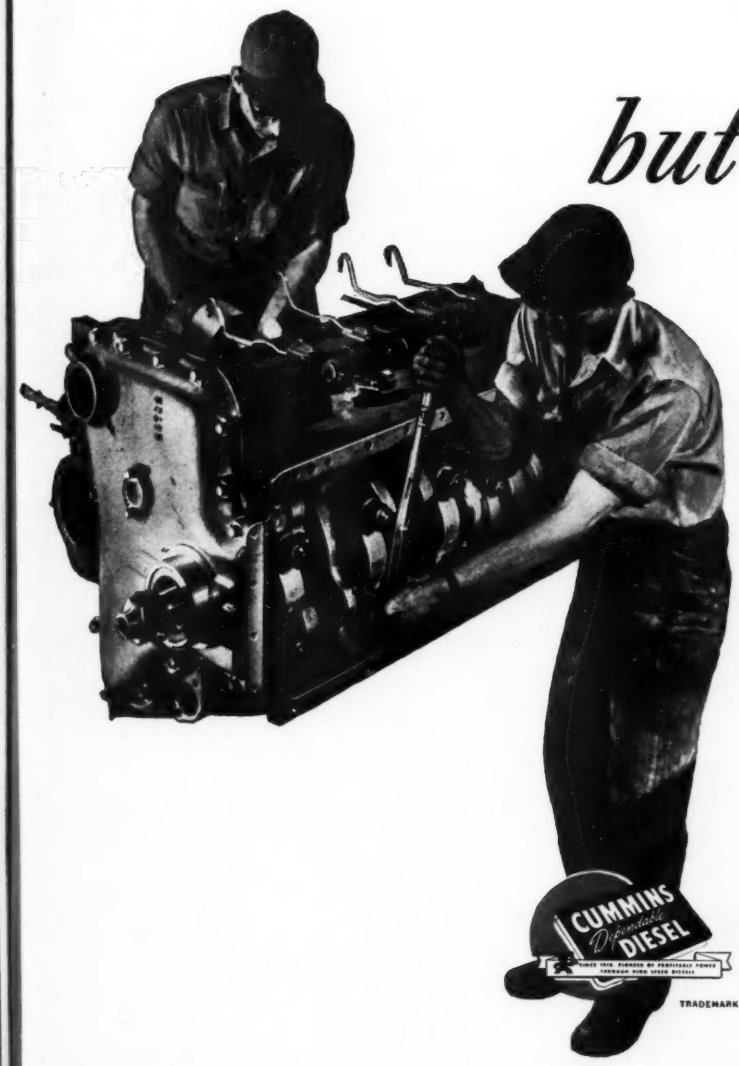
UNIVERSAL VIBRATING SCREEN CO.

RACINE, WISCONSIN

Cummins® Custom-built Diesels

Built not once

but Twice



The better-built engine for more profitable power

Yes, they're actually built *twice*. That's what makes a lightweight, high-speed Cummins Diesel such an efficient, dependable, precision-made engine. After initial assembly, each engine is run-in on the test block. Then it is torn down and carefully re-inspected—after that it is re-assembled and tested *again* to assure *peak performance.*

The finest of engine craftsmanship . . . exclusive Cummins fuel system . . . engines that are "custom-built to fit the job" . . . make a Cummins Diesel *a better buy for your power needs.*

Contact your Cummins dealer. He has more facts to show you about making more profits with

Diesel power by CUMMINS

TRADEMARK REG. U. S. PAT. OFF.

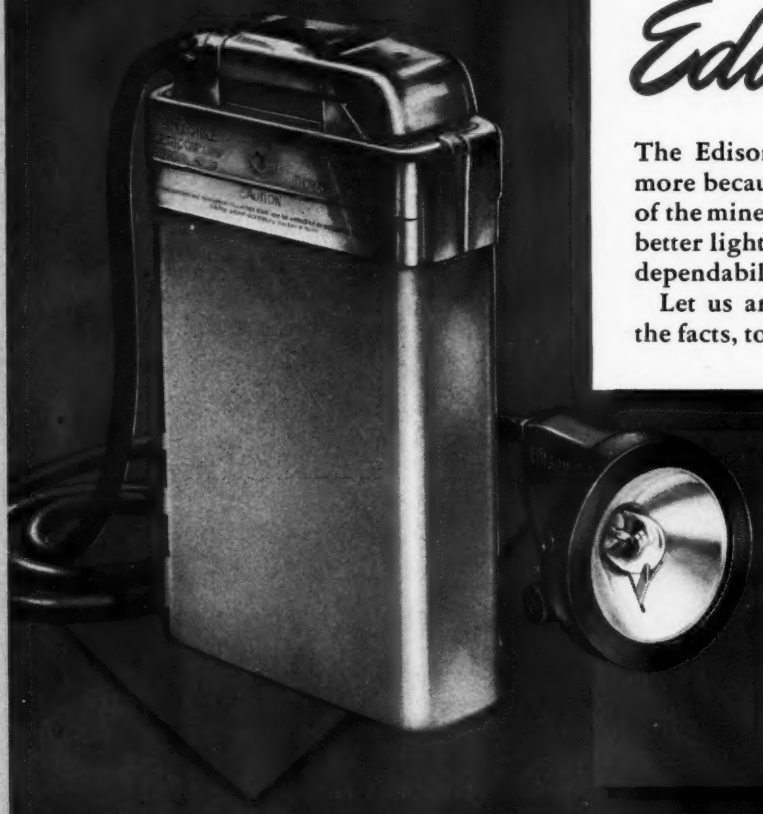
CUMMINS ENGINE COMPANY, INC. · COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. · Cable: Cumdiex

Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks · off-highway trucks · buses · tractors · earth-movers · shovels · cranes · industrial locomotives · air compressors logging yarders and loaders · drilling rigs · centrifugal pumps generator sets and power units · work boats and pleasure craft.

More Effective Light

BETTER DIRECTED TO THE JOB!



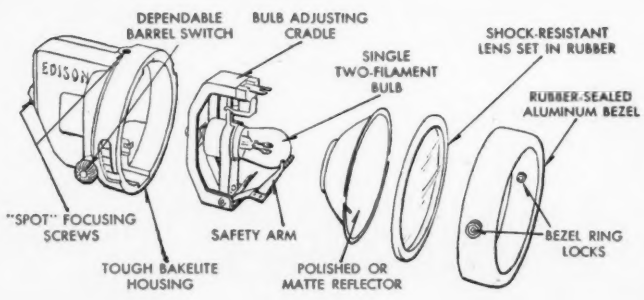
MODEL Edison R-4 ELECTRIC CAP LAMP

U. S. Bureau of Mines Approval No. 29

The Edison Model R-4 Electric Cap Lamp *does* more because it *has* more! This most essential tool of the miner increases tonnage with more light and better light . . . more convenience in use, complete dependability, and lower maintenance.

Let us arrange a demonstration—and give you the facts, too, on lower handling costs!

- PIERCING, LONG-RANGE SPOT OR FLOODLIGHT BEAM
- POSITIVE SPOT ADJUSTMENT
- BALANCED HEADPIECE
- SINGLE BULB WITH TWIN FILAMENTS
- STURDY CONSTRUCTION



NOTICE THE EDISON HEADPIECE REFINEMENTS

Every feature of the Edison headpiece reflects superio design engineering for better service. Headpiece is easil adapted for strong "spot" or flood beam. Simple 2-scre adjustment of spot without disassembly enables perfec focus always. The single gas-filled bulb has two filament of equal rating, so that effective working light is alway available by a turn of the barrel-switch that operates bot filaments. Quick removal and re-assembly of the reflecto bulb or rubber-cushioned lens is easy as the positi bezel-locking ring requires only a 1/8 turn—no thread Write for descriptive bulletin.

MSA
SAFETY EQUIPMENT HEADQUARTERS
FOR EVERY INDUSTRY

MINE SAFETY APPLIANCES COMPA

BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH

At Your Service! 48 BRANCH OFFICES in the UNITED STATES

MINE SAFETY APPLIANCES CO. OF CANADA LIMITED · Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow

Representatives in Principal Cities in Mexico, Central and South America CABLE ADDRESS: "MINSAF" PITTS